

T-3, ATM on tap for StrataCom

By Paul Desmond
Senior Editor

CAMPBELL, Calif. — StrataCom, Inc. this week will announce new modules for its IPX T-1 multiplexers that enable the devices to support T-3 links and advanced network services based on the Asynchronous Transfer Mode (ATM) standard.

The T-3 capability will assuage some users that have complained about the IPX's limited capacity, analysts said, while the ATM feature will position users to take advantage of emerging services such as Switched Multimegabit Data Service (SMDS).

StrataCom will address T-3 with its Modular T3 (MT3) bandwidth management module, which fits into existing IPXs and supports as many as eight T-3 trunks. The module is expected to be available in the third quarter. A planned ATM trunk module will convert 24-byte T-1 cells into ATM standard-compliant 53-byte cells. That module is scheduled to ship in second-quarter 1992.

A StrataCom spokeswoman confirmed that the company would make T-3- and ATM-related announcements this week but
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How StrataCom's T-3 support stacks up

Selected vendor T-3 multiplexer profiles

Vendor Product	Add/drop capabilities	Capacity	Available	Price
StrataCom, Inc. IPX with Modular T3	Subrate channels, 64K bit/sec, T-1, T-3	8 T-3s	Third quarter	\$35,000 to \$180,000
Adaptive Corp. SONET Transmission Manager	T-1, T-3	18 T-3s	Midyear	NA
Network Equipment Technologies, Inc. IDNX/90	Subrate channels, 64K bit/sec, T-1, T-3	4 T-3s	Now	\$100,000 to \$700,000
Newbridge Networks, Inc. 3645 MainStreet	Subrate channels, 64K bit/sec, T-1, T-3	8 T-3s	Now	\$35,000 to \$150,000
Timeplex, Inc. TX3/SuperHub	T-1, T-3	10 T-3s	Now	\$30,000 to \$200,000

NA = Not available

SOURCE: NETWORK WORLD AND INTERNATIONAL DATA CORP., FRAMINGHAM, MASS. GRAPHIC BY SUSAN J. CHAMPENY

Agriculture agency drafts ambitious OSI net strategy

By Ellen Messmer
Washington Correspondent

HYATTSVILLE, Md. — An agency of the Department of Agriculture last week disclosed plans to spend as much as \$500 million on a new open computing and network architecture that will give workers easy access to data bases, applications and other

er users on the network.

A top procurement official of the Animal and Plant Health Inspection Service (APHIS) said the agency this July will issue a request for proposal for the project.

APHIS decided to retire its aging minicomputer-based terminal networks in favor of distributed
(continued on page 6)

MCI to air plans for frame relay service

Carrier may use ICA conference as launching pad for service expected to be available by year end.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. is planning to announce support for frame relay service, possibly at next week's International Communications Association conference in Anaheim, Calif., *Network World* has learned.

An MCI spokeswoman would neither confirm nor deny the rumors, but sources said the carrier intends to announce its strategic plans for frame relay in Anaheim and commit to making the service available before year end.

One telecommunications analyst who requested anonymity said MCI is already beta-testing its frame relay service, a fact confirmed by a former MCI official.

Frame relay is an emerging interface standard for a high-speed packet-switching technology that will enable users to interconnect local-area networks and support other bandwidth-hungry applications.

British Telecom, Inc. and Sprint Data Group, the packet network unit of US Sprint Communications Co., have each an-

nounced plans to offer frame relay services. WilTel has already begun offering the service.
(continued on page 6)

Frame relay roster grows

MCI Communications Corp. plans to join the ranks of vendors offering frame relay.

Carrier	Available	Access options
BT North America, Inc.	Third quarter	56K, 64K bit/sec
CompuServe, Inc.	June	56K bit/sec
Graphnet, Inc.	Third quarter	56K bit/sec to fractional T-1
Infonet Service Group	By year-end 1992	NA
Sprint Data Group	Third quarter	56K and 64K bit/sec, fractional T-1, T-1
WilTel	Now	T-1

NA = Not available

GRAPHIC BY SUSAN J. CHAMPENY

NETLINE

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RENEGOTIATING a Tariff 12 contract can put a user's patience to the test. Page 4.

FCC's SIKES SAYS commission will set up bandwidth reserve for PCNs, possibly ousting microwave users. Page 4.

CARRIERS' ABSENCE at Senate hearing on RBHC manufacturing bill raises senator's ire. Page 4.

WIRELESS LAN MAKERS NCR and Motorola make waves at Comdex/Spring '91. Page 5.

COCOM RULING ON bundled network software may snag computer sales to Eastern Europe, Soviet Union. Page 6.

SNA IS BORN AGAIN, this time enhanced by the powers of APPN. Page 37.

FEATURE

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Test ranks routers in real-world environment

By Salvatore Salamone
Features Writer

A Saab or a Volvo? A diamond or an emerald? Filet mignon or prime rib? Life is filled with tough choices. And networking decisions are among the toughest. Choosing the right product can be critical to a network manager's career.

Take the selection of the best router. Information about the performance of different vendors' routers is usually available only from the vendors, whose published figures are selective and whose tests are done under varying and unknown conditions. So how can net users be sure which router is best?

From vendor information alone, they can't. But this article, the first in a series of laboratory tests of network products, will help users find out which router offers the best performance. This and other articles
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Network World/
Enterprise Technology Center

NETWORK TEST SERIES

Car industry mulls move to EDIFACT

By Wayne Eckerson
Senior Editor

SOUTHFIELD, Mich. — The automotive industry may forgo X12 electronic data interchange standards and embrace the international EDI for Administration, Commerce and Transport (EDIFACT) standards, a move that could dramatically boost EDIFACT's acceptance in the U.S.

The Automotive Industry Action Group (AIAG), which develops and maintains standards for the auto industry, is reconsidering its support for an effort now under way to align X12 and EDIFACT and is pondering whether member companies should migrate directly to EDIFACT.

Last year, the AIAG publicly supported the effort to align X12 and EDIFACT standards, citing the importance of having a single international standard for inter-
(continued on page 7)

Spec details use of FDDI over shielded twisted pair

Effort by group of 5 vendors could lead to a 20% to 30% reduction in cost of net adapter boards.

By Jim Brown
Senior Editor

LITTLETON, Mass. — Digital Equipment Corp. and four other vendors last week unveiled a specification for supporting 100M bit/sec Fiber Distributed Data Interface networks over shielded twisted-pair cabling.

The specification could enable vendors to build FDDI adapter boards that cost 20% to 30% less than existing FDDI boards for fiber-optic cable.

The vendors — Advanced Micro Devices, Inc., Chipcom Corp., DEC, Motorola, Inc. and SynOptics Communications, Inc. — said the specification will significantly reduce the cost of linking desk-

top devices such as workstations and microcomputers to FDDI networks.

Because the technology is relatively straightforward and shielded twisted-pair components are widely available, the vendors said they expect to be able to get products to market by year end.

DEC will announce products within the next two to three months, while Chipcom said it will release products by year end.

SynOptics has fiber boards and FDDI-over-shielded twisted pair in beta test now and expect to ship them this summer or early fall.

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Analysts advise postponing big equipment purchases

Host of mergers, acquisitions could obsolete tools.

By Bob Brown
Senior Editor

The network equipment market is poised for a "feeding frenzy" of mergers and acquisitions that will leave only a handful of vendors equipped to address the integration of local- and wide-area networks, according to industry observers.

For the next 12 to 18 months, analysts are advising users to postpone major equipment purchases and focus on short-term paybacks to protect against the threat of equipment made obsolete by market consolidation.

Jim Harrison, program director at the META Group, a West-

port, Conn., market research and consulting firm, this week will release a research brief urging users to "buy cautiously and avoid strategic product buy-ins until the dust settles [in 1992]."

Since late April, the network market has been rife with merger and acquisition activity, with most of the action taking place in the internetworking market.

Analysts pointed to Gandalf Technologies, Inc.'s purchase of Infotron Systems Corp., Network Systems Corp.'s acquisition of Vitalink Communications Corp. and ADC Telecommunications, Inc.'s buyout of Fibermux Corp.

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SNA gateway lets NetView see into realm of TCP/IP

By Barton Crockett
Senior Editor

ATLANTA — Open Connect Systems, Inc. last week announced a new TCP/IP-to-SNA gateway that includes features that enable users of IBM's NetView network management system to troubleshoot problems on remote TCP/IP devices.

The network management component of the new OpenConnect Server (OCS) II, gateway software that runs on an IBM RISC System/6000, attacks one of the biggest limitations of gateways linking Transmission Control Protocol/Internet Protocol to Systems Network Architecture

nets — the inability to extend sophisticated network management capabilities through the gateway.

"One problem [with TCP/IP-to-SNA gateways] is that you can't see across the gateway," said David Passmore, a partner with Ernst & Young, a consulting firm in Fairfax, Va. "It sounds like these guys have found a way to address that."

The network management software for the new OCS II gateway is called OpenConnect/Network Management Extended Facilities (OC/NMEF) and consists of two modules. One module

(continued on page 6)

Briefs

GUPTA tool to open data base doors.

GUPTA Technologies, Inc. is expected to unveil on June 4 a Microsoft Corp. Windows 3.0-based front-end data access tool that works with Microsoft's SQL Server, Novell, Inc.'s NetWare SQL, Oracle Corp.'s server products and GUPTA's own SQLBase as well as the major data bases from IBM. According to sources familiar with Quest, the tool will enable end users to access data in a variety of date bases without having to do any programming.

DEC to support FDDI over coaxial.

Digital Equipment Corp. last week acknowledged it is developing adapter boards that will enable workstations and other desktop devices to attach to DEC's Fiber Distributed Data Interface concentrator over thin-wire coaxial cable. The company demonstrated an early version of the products at Communication Networks '91 in February. The products consist of a workstation-based single port board and a six-port concentrator, which provides access to a backbone 100M bit/sec fiber cable. There are no plans to develop a standard for FDDI over coaxial cable.

AT&T offers 384K service.

AT&T's Software-Defined Data Network (SDDN) virtual data network service last week became available at the 384K bit/sec speed. Announced at the International Communications Association 44th Annual Conference and Exposition last May, SDDN enables users to establish high-speed switched data links on demand for applications such as disaster recovery and local-area network interconnection. SDDN 384 is available in 138 cities.

Newbridge details role in N.Y. net.

Newbridge Networks, Inc. last week formally announced that it has been selected by New York Telephone Co. to provide T-1 multiplexing equipment to be used in a data network being built for the Securities Industry Association (SIA) ("Brokerages to unite for volume network discounts," NW, June 18, 1990).

About 6,000 Newbridge 3624 intelligent channel banks and 3600 MainStreet T-1 multiplexers are being installed. More than 70 SIA member companies will use the net, including securities firms and banks. It will support various data requirements, in-

cluding links tying member companies with stock exchanges and market data providers.

Data base interoperability demo.

The SQL Access Group, a consortium of data base software and hardware companies, last week said it will stage a demonstration of multivendor data base interoperability this July in New York. The demonstration, which will feature a client/server setup, will test a prototype of the SQL Access Group's recently completed Phase I technical specification, which is intended to enable multiple front-end clients to support various back-end data base servers. The consortium, whose members include Oracle Corp. and Microsoft Corp., stated that its Phase II work will address Transmission Control Protocol/Internet Protocol networking support for data bases and tools.

AT&T, Teleos to team on ISDN push.

AT&T and Teleos Communications, Inc. last week announced a deal to form a joint sales and marketing alliance. Under the agreement, AT&T's sales force will sell Teleos Integrated Services Digital Network products with the carrier's network services, while Teleos' sales group will sell AT&T network services with its customer premises equipment. Teleos, based in Eatontown, N.J., manufactures ISDN equipment used to support local-area network interconnection and videoconferencing applications. The company also makes ISDN interfaces for private branch exchanges, computers and T-1 multiplexers.

Multimedia standards group convenes.

The Comdex/Spring '91 trade show in Atlanta last week was the site of the first meeting of a new standards group for multimedia systems. The group, a subcommittee of the Interactive Multimedia Association (IMA) in Washington, D.C., is seeking to establish a standard that would enable users to port multimedia software between different personal computers. The group discussed the merits of a multimedia standard recently proposed by a group of personal computer manufacturers. That standard is designed primarily for personal computers based on Intel Corp. chips. The IMA subcommittee wants to develop a multimedia standard that can be used with personal computers based on a variety of chips.

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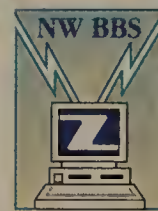
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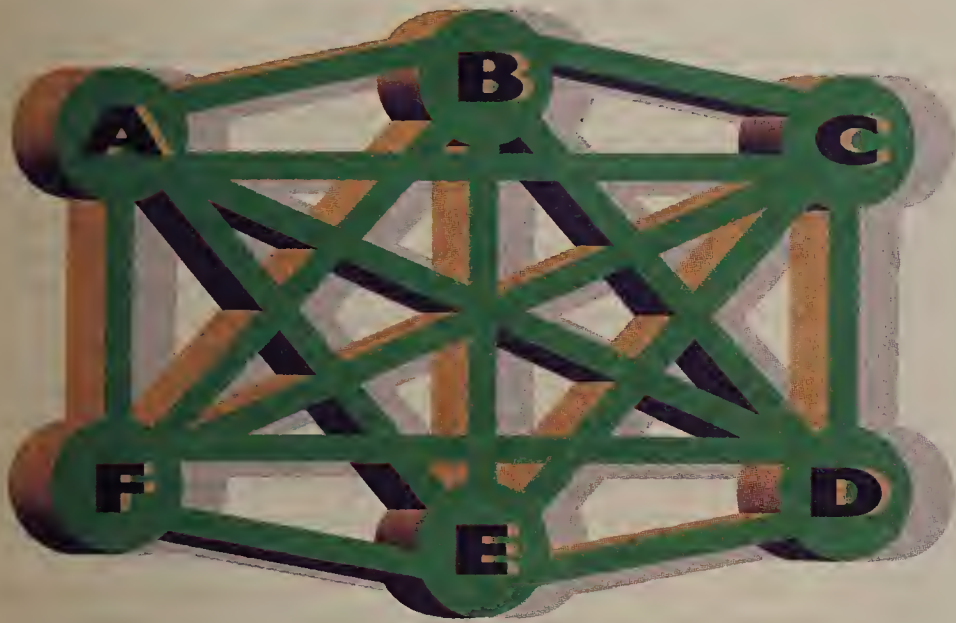
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Users discuss ins and outs of renegotiating Tariff 12s

By Bob Wallace
Senior Editor

Users with AT&T custom network contracts can expect a protracted, difficult and oftentimes adversarial process if they attempt to renegotiate their Tariff 12 arrangement.

Although AT&T has shown that it is willing to renegotiate the deals — it has revamped 27 to date — it typically only does so when the outcome increases its net profit or if it stands to lose business.

In fact, users that have renegotiated Tariff 12 options say AT&T is most willing to rework the network deals if customers threaten to move traffic to rival carriers MCI Communications Corp. and US Sprint Communications Co.

American Airlines, Inc., for example, said it's best to negotiate from a position of strength by letting AT&T know that the Tariff 12 traffic could be given to a rival if the two sides can't reach an agreement on a revamped deal.

"We kept the playing field level for all our vendors," said Bill

Jewell, American Airlines' managing director of communications engineering. "We did this by having the same team that negotiated with AT&T negotiate with competitors. We gave everyone the same information on our network plans."

American Airlines was prepared, if necessary, to move much of its traffic from AT&T to a competitor. "It's like raising a child," Jewell said. "If you make a threat that you're going to do something, you have to be prepared to follow through."

While it is clear that AT&T is now willing to revamp Tariff 12 deals (see "AT&T ready to bargain," page 57), the process is anything but smooth. For one thing, customers complain that renegotiations take too long.

"Negotiating with AT&T was like negotiating with the Kremlin," said a network manager for a large insurance company who requested anonymity. Eight months passed between his company's first meeting with AT&T and the signing of the renegotiated custom network contract.

"AT&T dragged their feet," he said.

On at least three occasions, the network manager and AT&T's negotiating team reached verbal agreement on items only to have the offer pulled back after the AT&T team took the agreement back for final approval.

When AT&T decided to rework the insurance company's Tariff 12, it put all items in the original contract up for renegotiation.

"We thought a lot of the items we had in the first option would be included in the second option," the manager said. "But AT&T said everything was up for (continued on page 57)

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Novell maps out plans for multivendor user group

Noorda sees OURS as customer forum for ideas.

By Caryn Gillooly
Senior Editor

ATLANTA — Novell, Inc. President and Chief Executive Officer Ray Noorda last week disclosed that the local-area network vendor plans to form an organization to address user needs for multivendor networks.

During his keynote presentation at Comdex/Spring '91, Noorda said Novell will launch the Open User Requirement Systems (OURS) group, which will be open to NetWare users, as well as users of other products and services and vendor representatives.

"The OURS mission [will be] to drive the computer industry to customer priorities rather than vendor priorities," Noorda told Comdex attendees.

He said that, in the past, the industry possessed a "single ven-

dor mentality," where users joined vendor-specific user groups. In this venue, however, users could only discuss their needs with regard to that vendor.

Today, users' focus is on multivendor networking. "Multivendor customers means we have to have a mentality to deal with that," Noorda said.

OURS, he said, would meet that need by providing a user forum with a multivendor scope. This way, users would be able to express their needs without a vendor-specific focus and vendors would be able to respond to a wider scope of issues.

According to a company spokeswoman, OURS is still just an idea; the company has not officially unveiled the organization. In fact, Noorda said Novell is currently looking for charter sponsors of the group.

Noorda made it clear that Novell's vision for the organization is taking shape.

In addition to serving as a forum for the exchange of ideas and user requirements, OURS will conduct benchmark tests of multivendor product configurations at neutral sites, he said.

Novell did confirm that a number of vendors have already expressed interest in sponsoring

the group, although it declined to reveal which vendors have stepped forward.

Users at Comdex responded favorably to the prospect of a multivendor user group. "It makes a lot of sense to me; networks are more and more a multivendor area," said Edwin Wilk, network manager at WHDH-TV in Boston. "Any forum that could get vendors together and get some answers for users would be great."

Alex Perez, information center specialist at Southeast Bank in Miami, agreed. "This might not be a bad idea," he said. "After all, anything that will give vendors more user input is never bad."

Both Wilk and Perez, however, were skeptical of how such a user group would be implemented. Both said the crucial issue would be to keep the focus on the users.

"This has potential, if it doesn't become a sales and marketing tool for these vendors," Wilk said. "I've seen that happen to a lot of other user groups, where it simply becomes one big sales meeting."

Perez was a bit more skeptical, doubting whether vendors would get involved. He explained that even in trade show sessions with rival vendors speaking on the same topic, users often put vendors on the spot and vendors, in return, refuse comment.

"This kind of an organization could open up a whole Pandora's box of issues" that vendors might not want to deal with, he said. □

FCC devises plan to reserve bandwidth for PCN users

May call for eviction of some microwave users.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — FCC Chairman Alfred Sikes last week said the commission will begin a proceeding this fall to establish what he called a New Technologies Spectrum Reserve in the 1.8- to 2.2-GHz band, a step toward displacing microwave users in favor of personal communications network (PCN) users.

In an interview with *Network World*, Sikes outlined the Federal Communications Commission's plan to begin proceedings designed to set aside bandwidth for the emerging wireless PCN technology. Although the proceeding is likely to target specific microwave users for displacement, the FCC is also seeking to establish new methods of compensating licensed microwave users for the loss of the spectrum.

Sikes' comments made it clearer than ever that at least some microwave users will be evicted to make way for PCNs.

The commission has made it known for more than a year that it considers microwave use in the 2-GHz range a possible impediment to the deployment of PCN voice and data services. The FCC was hopeful that spread-spectrum techniques would allow the coexistence of PCNs and micro-

wave. In fact, it had licensed several tests nationwide in the hope of proving it.

But while some companies believe PCN and microwave can share the same bands, Motorola, Inc. recently stated that bandwidth sharing through spread spectrum is not feasible where PCN is widely deployed. Interference with microwave systems would invariably result, the company said.

A few months ago, Tom Stanley, chief engineer at the FCC, said that even if sharing is feasible, some spectrum may still be vacated for PCNs.

In an attempt to make the displacement process as painless as possible, Sikes said the FCC is exploring plans under which microwave users could be bought out by parties interested in obtaining access to their bandwidth.

"We're trying to develop policies to compensate those asked to move," he said.

Although the Communications Act of 1934 precludes spectrum auctioning per se, Sikes said he is confident the FCC can come up with other approaches that would allow microwave users to be bought out.

The commission is waiting for the delivery of an internal spec- (continued on page 56)

Groups attack RBHC bill; senator miffed at carriers

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Industry and consumer groups, as well as long-distance carriers, dominated a Senate hearing here last week in which they sharply criticized a bill that would lift manufacturing restrictions on the regional Bell holding companies.

The RBHCs suffered a major setback during the hearing when Sen. Howard Metzenbaum (D-Ohio) pledged to shoot down the bill because the RBHCs had failed to send top officials to testify about the market impact of the legislation.

Metzenbaum, chairman of the Senate Judiciary Committee, organized the hearing to investigate the possible antitrust implications of the legislation.

In place of senior management, the RBHCs dispatched Stephen Shapiro, an attorney with Mayer, Brown and Platt of Chicago, to speak before the Senate Judiciary Subcommittee on behalf of all seven RBHCs in support of the S.173 manufacturing bill in-

troduced by Sen. Ernest Hollings (D-S.C.).

However, coming at the end of more than three hours of intense criticism of the Bells by those testifying, Shapiro's plea was a case of too little, too late.

In opening the hearing, Metzenbaum denounced the RBHCs for their decision not to send management to represent them. "This is the first instance I've seen where a party interested in a matter concerning them declined to appear," he said. Metzenbaum labeled the Bells' absence a new low in industry conduct.

Spokesmen for several of the RBHCs said they hadn't anticipated Metzenbaum's reaction and sent Shapiro because of his expertise in antitrust matters.

Throughout the hearing, opponents of the Hollings bill offered testimony as to why permitting the Bells to manufacture telecommunications equipment would negatively impact the telecommunications equipment market and end users.

(continued on page 7)

Correction: Due to an editing error, the wrong figure was provided for the cost of an AT&T study in which 14 large users said they would like to see the carrier given more marketing freedom. The correct cost of the survey was \$200,000.

New versions of NCR wireless LAN support broad range of platforms

By Barton Crockett
Senior Editor

ATLANTA — At the Comdex/Spring '91 trade show here last week, NCR Corp. expanded the number of personal computer platforms supported by its Wavelan wireless local-area network, while Motorola, Inc. slashed the price of its Altair wireless Ethernet product.

Originally available only for DOS-based microcomputers in Novell, Inc. NetWare Version 2.1 environments, Wavelan is now available for NetWare Version 3 LANs and personal computers running OS/2.

Additionally, NCR is shipping a version

of Wavelan that supports the Network Driver Interface Specification (NDIS), a Microsoft Corp. specification intended to enable users to mix and match operating systems and network interface cards.

NDIS support will enable Wavelan to work not only in Microsoft LAN Manager nets, but also in the LANs of other vendors supporting the NDIS standard, including Banyan Systems, Inc.'s VINES, IBM's LAN Server and 3Com Corp.'s 3 + Open as well as Transmission Control Protocol/Inter-

net Protocol nets, company officials said.

In July, NCR will begin shipping versions of Wavelan network interfaces for Micro Channel Architecture personal computers, in addition to the Personal Computer ATs currently supported. In a few months, the company also plans to come out with versions for Unix platforms.

Daryl Maddox, senior product manager for NCR's financial systems division in Dayton, Ohio, said, "We've gone roughly from [supporting] 50% to [supporting] 80% of the installed base of PC LANS."

The Wavelan line consists of radio network interfaces for personal computers that enable microcomputers to communicate over the airwaves at rates up to 2M bit/sec using spread-spectrum technol-

ogy. Wavelan is slated to begin shipping in December at a cost of \$1,390 per node.

Meanwhile, Motorola last week slashed the price of its Altair wireless Ethernet product by more than two-thirds.

Altair consists of User Modules that are connected via standard Ethernet links to as many as six Ethernet devices. User Modules are then linked via 18-GHz radio connections to Control Modules, which are tied to Ethernet backbones via standard servers. Altair supports wireless communications at 10M bit/sec.

Previously, the suggested retail price for Control Modules was \$3,995 each, while User Modules cost \$3,495 each. Now the suggested retail price for each unit has been reduced to \$995. ■

US Sprint offers clear channel private lines

By Bob Wallace
Senior Editor

KANSAS CITY, Mo. — US Sprint Communications Co. last week announced a 64K bit/sec clear channel data communications capability for its full line of private-line services and rolled out a new T-1 performance monitoring program.

The new Clear Channel feature increases from 56K to 64K bit/sec the amount of channel bandwidth available to customers of Clearline 1.5 (US Sprint's T-1 service), Clearline Fractional 1.5, (its fractional T-1 offering) and Clearline DDS 64 (the carrier's 64K bit/sec digital data service).

Clear Channel is also available with International Clearline 1.5, International Clearline Fractional 1.5 and International Clearline Clear Channel, a 64K bit/sec private-line service. These require local exchange carrier clear channel T-1 access for the domestic side of the links.

In addition to freeing up 8K bit/sec of bandwidth, the move to clear channel is important because 64K bit/sec channels are the standard increment for switching systems and higher speed links worldwide.

"What [US Sprint] is doing here is filling an important hole," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. "Users need the extra bandwidth and the ability to [acquire] end-to-end international 64K bit/sec links."

US Sprint is the last of the Big Three carriers to support clear channel on its private-line services. It could not offer a clear channel capability until now because it utilized an older line coding scheme that uses 8 bits within each 64K bit/sec channel for transmission management, leaving only 56K bit/sec for data transmission. The company now uses bipolar eight zero substitution line coding.

Greg Crosby, US Sprint's Clearline services director, said users of late-model channel service units (CSU) can just reset the units to support the clear channel feature.

Briere added, "The clear channel capability brings [US Sprint] up to fractional T-1, par with AT&T, WilTel and Cable & Wire-

(continued on page 57)



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Features	NSA	DCA	Attachmate
Real memory use for one 3270 session (PC-DOS)	65Kb	136Kb ⁽¹⁾	101Kb ⁽²⁾
APPC support	Yes	Yes ⁽³⁾	No
Number of data links supported	7	5	4
Number of coax and SDLC cards supported	39	5	17
SNA protocols supported	3270 APPC RJE LU0	3270 APPC	3270
Async SNA support	Yes	No	No

Based on published marketing materials from DCA and Attachmate. (1) For IRMAX DFT running DFTSK module. (2) For EXTRA Extended in Standard Mode. (3) DOS APPC support limited to DCA/Microsoft Select CS. Trademark ownership: Windows (by Microsoft), DCA and IRMAX (by Digital Communications Assoc.), Attachmate and EXTRA (by Attachmate).

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Revised regulations could hinder systems sales abroad

U.S. gov't concerned with possible military use of dynamic adaptive routing technology.

By Eric Smalley
Senior Editor

PARIS — Revisions to international trade regulations under consideration by the Coordinating Committee for Multilateral Export Controls (COCOM) in meetings here last week could make bundled networking software a barrier to computer system sales into Eastern Europe and the Soviet Union.

At issue is dynamic adaptive routing technology, which the U.S. government is concerned could be used by unfriendly governments to build military command and control networks that are resilient to attack.

The routing technology, however, is a basic component of networking software such as Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.'s DECnet. Such network software is often bundled with computer operating system software, which in turn is bundled with the computer systems themselves.

Agency drafts OSI net strategy

continued from page 1

ed local-area networks at its 1,200 local sites, which will be linked to a data center here.

Jack Palmieri, APHIS procurement officer, said the agency opted for an immediate cutover to Open Systems Interconnection rather than a phased implementation because it would save APHIS upward of \$7 million it would have otherwise spent on gateways to link proprietary systems to an OSI backbone.

"APHIS sees OSI as the means to achieve its Information Resource Management objective of consistency in using and sharing information," Palmieri said. "While it won't be easy, the benefits far outweigh the effort."

APHIS is just one of 25 Agriculture Department agencies; it is responsible for nationwide control of animal and plant diseases, animal inspections, quarantines and overseeing regulations on endangered species. It employs more than 6,000 workers, including wildlife officers, veterinarians and farm inspectors.

Only a handful of the agency's 1,200 sites today are linked via electronic mail facilities, and the lack of connectivity prohibits personnel from sharing files and accessing strategic data bases. The lack of on-line access to data bases throughout the department is one of the biggest headaches at APHIS today, Palmieri said.

The regulations that could make this technology off limits for Eastern Bloc countries are embodied in changes that COCOM — an organization of U.S. and Western European governments that regulates trade to Eastern Europe — made last week when it restructured its list of dual-use products. Dual-use products are designed for commercial use but can be used or easily adapted for military purposes.

State department officials and representatives of the computer manufacturers said the text of the revised regulations will not be available to them until this week.

U.S. security concerns are focused on the telecommunications category of dual-use products, which encompasses products that can be used to build command and control networks.

The problem has been the overlap of the telecommunications and computer categories, said Cesare Rosati, technical advisor to the U.S. State Department's Office of COCOM Affairs.

ment's Office of COCOM Affairs.

Though the U.S. government has no intention to restrict computer systems sales, regulatory agencies vigorously enforcing telecommunications restrictions could inadvertently affect computer sales, Rosati said.

The changes adopted by COCOM should help clarify the distinctions between the telecommunications and computer categories, he said, thus avoiding the problem.

However, computer systems manufacturers are worried that the government will choose to control wide-area networking by attempting to restrict software, said Lee Mercer, DEC's corporate export manager. Those efforts could create roadblocks to the sale of computers to Eastern Europe because computers often come with software that can be used in telecommunications nets.

"The danger is if the language is too restrictive, it might literally force computer manufacturers to develop and maintain two categories of products," Mercer said.

In addition to the potential financial consequences for U.S. computer manufacturers, the restrictions would be ineffective, he said, because software using dynamic adaptive routing technology has been widely available for years. □

sites. Other than some E-mail between the agency's 10 regional offices, Hyattsville headquarters and the external National Finance Center and Customs Service offices, there is little connectivity among APHIS sites.

If employees need information from another APHIS location, they have to call an employee there to run a data base search, retrieve a file or locate a computer tape, then ship that information via mail or courier.

"We don't have interoperability at APHIS today," Palmieri said. But with the installation of new systems, "we'll be able to access the information rather than ask for it."

The general lack of connectivity at the agency is viewed as a plus because it allows APHIS to start fresh, without concerns about retaining investments in existing systems, Palmieri said.

The 8-year-old minicomputers and dumb terminals offer APHIS regional offices the luxury of simply tearing out the old systems, instead of tackling the migration problems associated with an installed base, he added.

Palmieri pointed out that starting fresh will spare APHIS from having to install a large number of X.400 gateways at locations where disparate E-mail systems are used.

APHIS said installing open systems would save it about \$7 million in the long run, rather than linking the disparate E-mail systems via X.400 gateways. □

MCI plans frame relay service

continued from page 1

MCI staffers have been debating internally whether to offer frame relay for some time and may have finally decided to go ahead with the service because of competitive pressure from other carriers.

Employees in MCI's data marketing group have been pushing for frame relay, while others involved with network operations in the firm have questioned whether there is an adequate market for the service, according to MCI sources.

Steve Taylor, a principal with Distributed Networking Associates in Greensboro, N.C., said he has no direct knowledge of MCI's intentions but added that any carrier interested in offering frame relay will have to move soon.

"I don't think [carriers] will lose significant market share so long as they announce by October," Taylor said. "But if they announce after that, they risk it looking like too little, too late."

Prompted by Infonet

Another reason MCI may have decided to go forward with frame relay is that Infonet Services Corp., a value-added network firm in which MCI holds a 25% stake, announced last week that it will roll out frame relay next year.

Although Infonet's actions don't necessarily indicate what MCI will do, the company's endorsement of frame relay may have swayed MCI to go ahead with

the service. The carrier's relationship with Infonet, which is also partially owned by foreign telecommunications firms, could enable the two companies to offer frame relay on an international basis.

A different approach

Unlike other carriers that are planning to offer frame relay using StrataCom, Inc.'s IPX fast packet multiplexers, MCI is said to be rolling out the service using existing network switches.

In February, MCI began a major upgrade of its Northern Telecom, Inc. and DSC Communications Corp. network switches in order to increase network capacity and allow them to support new services ("MCI switch upgrade widens service options for users," *NW*, Feb. 18).

Northern Telecom has been shipping DataSPAN software, which supports frame relay, since last year.

Joe Terry Swaim, vice-president of switch systems engineering at MCI, in February said the upgraded switches could be used to support frame relay.

Analysts said that using network switches to provide frame relay instead of StratCom multiplexers may offer MCI some advantages.

Rosemary Cochran, vice-president of technology at Vertical Systems Group, a consultancy in Dedham, Mass., said, "Northern Telecom is traditionally a supplier to phone companies, whereas StrataCom is not. StrataCom boxes are designed for a private network environment, and its architecture is proprietary." □

NetView sees into realm

continued from page 2

runs on a mainframe in conjunction with NetView, while the other runs on the RISC System/6000 workstation configured as an OCS II gateway.

The OC/NMEF software lets NetView operators correct network faults by using their consoles to run diagnostic tests, synchronize system timers, download new versions of software and execute application commands on TCP/IP hosts.

If users load application program interface software from Open Connect onto remote TCP/IP hosts, NetView can also receive network fault alerts from the remote TCP/IP hosts.

Passmore said that Open Connect's implementation appears to exceed other TCP/IP-to-SNA gateways by letting NetView monitor and fix network faults generated by remote TCP/IP devices. In most gateway implementations, NetView is only able to monitor and correct faults generated on the gateway device but not beyond it.

Paul Johnson, vice-president

with Needham & Co., an investment firm in New York, added that Open Connect's approach to integrating TCP/IP alarms into NetView is better than IBM's approach, which he said users have criticized.

IBM integrates TCP/IP into NetView by loading TCP/IP software onto the mainframe, which communicates with other TCP/IP devices as a peer.

According to Johnson, users have complained that IBM's implementation of TCP/IP does not fully conform with TCP/IP.

Open Connect's Chief Executive Officer Bernard Hogan said the new OCS II gateway represents a technological advance over the firm's previous gateways. The earlier OCS gateways performed functions similar to OCS II but ran only on proprietary processors based on Motorola, Inc. 68000 chips.

The new RISC System/6000 platform offers more horsepower than its predecessors.

For example, OCS II running on a RISC System/6000 can support as many as 256 simultaneous logical sessions, while the older OCS gateway could only support 128. □

Car industry mulls EDIFACT standards

continued from page 1

company electronic communications. However, with pressure growing on U.S. companies to compete on a global basis, automotive firms are starting to see the importance of making a clean break to EDIFACT.

"If the AIAG recommends a quick migration, it would give great impetus to EDIFACT in the U.S.," said Irv Chmielewski, vice-rapporteur of the North American EDIFACT board and an AIAG member. "That would bring 4,000 to 5,000 companies doing EDI in the auto industry into the EDIFACT fold."

The AIAG has formed an ad hoc committee to investigate whether it would be best for the auto industry to migrate to EDIFACT or wait for X12 and EDIFACT standards to converge, a process some observers say will take at least three or four years.

The committee, which will meet for the first time June 17 to set goals and objectives, was formed in response to a proposal submitted by AIAG members at a recent roundtable. The new committee plans to issue a recommendation by year end, according to Jim Bruneel, associate director of AIAG and an information systems supervisor at Chrysler Corp.

Besides competitive pressures, some AIAG members at the invitation-only roundtable said supporting two EDI standards and two standards groups is redundant and inefficient. They also said plans for aligning X12 and EDIFACT have not been clearly defined and may not be worth the effort.

Groups attack RBHC bill; senator miffed

continued from page 4

The most frequently mentioned criticisms were charges that the RBHCs would likely engage in anticompetitive behavior by subsidizing equipment manufacturing at ratepayers' expense and taking business away from other equipment makers.

In defense of the RBHCs, Shapiro said their entry into manufacturing would spur research and development. He added that state regulators and the Federal Communications Commission would "lean over backwards to safeguard ratepayers."

Peter Bradford, chairman of the New York State Public Utility Commission, testified that state regulators could not hope to adequately monitor the Bells if they are allowed into manufacturing.

Joan Spero, executive vice-president of corporate affairs and communications at American Express Co., voiced concerns that the RBHCs' manufacturing freedom could result in higher access charges and diminished competition in manufacturing.

"If [the Bells] were in a position to purchase their own equipment, they could drive others out of the market," she said.

However, Spero noted that American Express is not totally opposed to allowing the RBHCs into manufacturing if other restrictions, such as barring them from selling to themselves, are written into the bill.

After the hearing, a Metzenbaum aide said the senator is now considering blocking the Hollings bill. This action would prevent the bill from coming to a vote on the Senate floor, effectively killing it. ■

Some members also decided it was important to join ranks with the European auto industry, which recently declared its commitment to move from proprietary standards to EDIFACT, Bruneel said.

Counting the costs

But not all AIAG members attending the roundtable were thrilled with the idea of abandoning X12, Bruneel added. Some have spent millions migrating from proprietary to X12 standards and aren't enthused about repeating the process.

Chmielewski said resistance to EDIFACT is greatest among automotive suppliers, which don't have the financial resources or global trading partners of the Big Three automakers.

Bruneel said it is unlikely the AIAG would endorse migrating to EDIFACT if the costs of converting from X12 were significant.

"I seriously doubt the auto industry would undertake another costly conversion," Bruneel said.

But some observers said the cost of migrating to EDIFACT will be significantly less than commonly thought and the major hurdle will be psychological.

Jeff Sturrock, senior manager at Ernst and Young in Dallas and chairman of the X12/EDIFACT Alignment Committee, said the EDI software available today will minimize the impact of migrating from X12 to EDIFACT.

While many companies had to com-

pletely revamp their EDI translation software when they moved from proprietary to X12 standards, many EDI software packages today already support both X12 and EDIFACT message sets, said Sturrock, a participant in the roundtable.

Moreover, since X12 and EDIFACT data dictionaries and transaction sets are already fairly compatible and will become more compatible as new versions are released, it will be less costly and burdensome to integrate EDIFACT into existing applications.

"Software is no longer the issue," Sturrock said. "The impact of moving to EDIFACT isn't as great as some people think. There are emotional and parochial issues impeding the growth of EDIFACT now." ■



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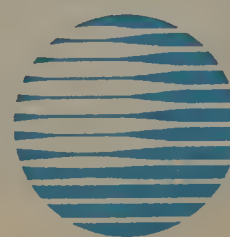
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“**T**he open systems initiative is the information technology industry's version of free trade.”

Donald Sheppard
Senior consultant
Protocols, Standards &
Communication, Inc.
Toronto

Fibermux buy may boost ADC net market presence

Acquisition boosts ADC's private net market push.

By Bob Brown
Senior Editor

MINNEAPOLIS — In a move to boost its presence in the private network and fiber-optic network markets, ADC Telecommunications, Inc. recently acquired Fibermux Corp. for about \$50 million in cash.

lition profit last year and posted revenue of about \$260 million.

Fibermux, a privately held firm based in Chatsworth, Calif., specializes in fiber-based products for local- and wide-area networks. Among the company's primary product lines are its FX4400 Magnum Enterprise Multiplexers and Crossbow intelligent wiring hubs.

The firm posted revenue of about \$23 million last year and is expected to report revenue of between \$15 million and \$30 million from May until October, when ADC reports its year-end financials, according to Aimee Gallagher, ADC's treasurer.

Charles Denny Jr., ADC's chairman and chief executive officer, said Fibermux provides ADC with an entry into the booming internetworking market.

“With ADC contributing its financial resources, strong market distribution channels and high bandwidth technology capabilities, our combined strengths will enable us to offer a broader range of connectivity solutions to our total customer base,” he said.

Recently, ADC has expanded
(continued on page 10)

ADC made a \$22.9 million profit last year and posted revenue of about \$260 million.

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ADC has agreed to pay up to another \$10 million in cash during a 2½-year period, contingent on Fibermux's financial performance.

ADC, based here, manufactures and markets a variety of cable management devices and transmission products used mostly by telephone companies. The company made a \$22.9 mil-

People & Positions

Time Warner, Inc. last week said it has hired **Dennis Patrick**, former Federal Communications Commission chairman, as chief executive officer of **Time Warner Telecommunications**, a new subsidiary that will develop and market radio-based personal communications networks. Three other former FCC employees — **Alex Felker**, **Lisa Hook** and **Douglas Minster** — have been hired into management positions at the newly created Time Warner subsidiary.

John Thibault last week was named president and chief executive officer of **Coral Network Corp.**, a Marlborough, Mass. startup in the local-area network-to-wide-area network market.

Previously, Thibault was senior vice-president of product operations at Codex Corp.

Calabasas, Calif.-based **Tekelec, Inc.** last week named **Willy Verbestel** as director of technical standards and **Robert Musselwhite** as senior director for marketing for signaling and cellular products.

Verbestel, formerly a senior member of the technical staff at the Science & Technology division of Ameritech, will be responsible for supervising diagnostic systems based on emerging standards.

Musselwhite, formerly international product development at US Sprint Communications Co., will oversee cellular and signaling marketing efforts.

(continued on page 10)

INDUSTRY BRIEFS

Cabletron, Silicon Graphics to partner. Cabletron Systems, Inc., an East Rochester, N.H., maker of intelligent wiring hubs, next month will unveil an alliance with Silicon Graphics, Inc., a Mountain View, Calif., workstation maker, according to a Cabletron spokesman. No further details were available about the agreement aside from that it will be officially announced on June 17.

Ungermann-Bass to resell token-ring cards. Ungermann-Bass, Inc. last week said it will resell Olicom 16M/4M bit/sec token-ring adapters under a multimillion-dollar reseller contract it signed with the Copenhagen, Denmark-based company.

Ungermann-Bass will market Olicom's Access/Industry Standards Architecture (ISA) Token-Ring and Access/Micro Channel (MC) Token-Ring cards in the U.S. and Europe. The cards support shielded twisted pair as well as coaxial and unshielded twisted pair wiring connections.

The Access/ISA Token-Ring card is priced at \$895, while the Access/MC Token-Ring card is priced at \$925.

PacTel sells PCN stake. PacTel Corp., a subsidiary of Pacific Telesis Group, last week announced the sale of its 25.3% stake in Microtel Communications, Ltd., a British personal communications network (PCN) company, to British Aerospace PLC. Terms of the deal were not disclosed.

Microtel, which expects to begin service in 1992, is one of three companies offered a license to build a PCN in the U.K. A PacTel spokesman said the move will enable the company to
(continued on page 10)

Unisys and IBM OSI strategies

As outlined at the recent North American Open Systems Conference

Unisys' 5R2 platform calls for:

Upgrades to its Communications Management System software operating on Unisys 2200 and 1100 mainframes to support:

- OSI Transport Services Access Method.*
 - Transport Class 4,* which provides support for multiplexing, error detection and recovery.
 - Connectionless Network Protocol,* which handles routing of network messages by adding addressing information to each.
- Upgrades to its Distributed Communications Processor software to support the Intermediate System to Intermediate System* routing protocol for providing dynamic routing between intermediate systems.

Available: August 1991

IBM's SNA/OSI integration plans call for:

- Creation at the transport layer of an IBM-specific Common Transport Access for SNA and OSI application protocol.
- Creation of a Transport Semantics set for identification, header substitution and routing of SNA and OSI protocols to transport-level gateways.
- Common network management for SNA and non-SNA resources using Common Management Information Services* and the Common Management Information Protocol.*

Available: No release date

*International Standards Organization standard

GRAPHIC BY SUSAN J. CHAMPNEY

SOURCE: UNISYS CORP., BLUE BELL, PA., AND IBM, ARMONK, N.Y.

IBM, Unisys map out plans to support OSI

Unisys to support OSI on multiprotocol backbone; IBM chooses OSI/SNA encapsulation approach.

By Ellen Messmer
Washington Correspondent

VANCOUVER — At a recent conference here, IBM and Unisys Corp. mapped out plans to support the coexistence of proprietary protocols in enterprise networks along with Open Systems Interconnection protocols.

Both vendors stressed that their strategies to support a mix of proprietary protocols alongside OSI protocols will protect user investments in installed hardware during the move to open systems.

“Our customers have a major investment in these systems, and they're not going to throw them away,” said Phil Wimpenny, a Unisys product marketing manager at the North American Open Systems Conference. “We're making use of the investment our customers already have.”

While the two companies are moving to better support OSI in their existing network architectures, they both have distinctly different strategies for doing so.

Although the official announcement is not due until June, Wimpenny offered conference attendees a glimpse of the company's 5th Release Version 2 (5R2) communications platform.

The 5R2 strategy is based on a series of software upgrades to the company's Communications Management System (CMS) software, which runs on Unisys 1100 and 2200 mainframes and establishes sessions with the vendor's Distributed Communications Processors (DCP). Under the plan, Unisys will also release soft-

ware upgrades for its DCPs.

Basically, Unisys is committed to moving to a native implementation of the OSI protocols in its Digital Communications Architecture (DCA), which would enable users to support pure OSI nets. In the interim, the company is planning to support multiprotocol backbones capable of transporting OSI data over the same pipe that handles data based on proprietary Unisys protocols.

This is a departure from the vendor's current strategy of supporting OSI protocols via routing

“**W**e're making use of the investment our customers already have,” Wimpenny said.

▲▲▲

bridges that move OSI data over an X.25 or IEEE 802.3 network separate from the backbone that supports the company's proprietary protocols.

The CMS upgrades will include support for three OSI transport protocols: the Transport Services Access Method (TSAM), Connectionless Network Protocol and Transport Class 4 (see graphic, this page).

However, the Unisys stack will not be fully OSI-compliant because it will still rely on existing
(continued on page 10)

IBM, Unisys map out plans to support OSI

continued from page 9

Unisys upper layer services in the proprietary Distributed Data Processing-Program-to-Program Communication mainframe-based software, which provides applications layer and presentation-level services supporting DCA, OSI and IBM's Systems Network Architecture protocols.

In order to provide OSI routing support, Unisys will also add support for the Intermediate System-to-Intermediate System (IS-IS) ISO-standard routing protocol to its DCP line, which handles terminal traffic and protocol conversion, as well. The addition of IS-IS will give users OSI routing support, enabling them, for instance, to shuttle OSI data between routers over a wide-area network.

"What we're saying is, 'You've got that DCA backbone in place, and you want to start running OSI. Now, rather than going at it through an X.25 connection, OSI data can be sent across the DCA backbone already in place,'" Wimpenny said.

Unisys also plans to introduce similar upgrades for the Burroughs Network Architecture but no timetable has been set.

In the long run, Unisys plans to offer a full-OSI native implementation. "We will upgrade DCA to fully conform to OSI," Wimpenny said.

At the conference, IBM laid out a distinctly different OSI migration plan. Its strategy calls for the coexistence of SNA and OSI protocols on the same backbone,

but IBM would offer software to detect the presence of an SNA or OSI backbone, and then encapsulate data to run over it.

If, for instance, a user wished to transport OSI data to another site supporting OSI, the data could travel over an existing SNA backbone by being packetized in SNA protocols and passed to a gateway that

Now OSI data
can be sent across
the DCA backbone already
in place.

▲▲▲

would strip the SNA headers and hand off the OSI data to a local device.

"We want to be able to carry OSI data over SNA networks, and vice versa," said Glen Shelton, IBM manager of communications systems architecture.

The goal is to free the user with an IBM backbone net from having to use a duplicate network to transmit OSI data, according to Shelton.

"Our direction is to provide a set of interfaces and services to protect the appli-

cation program from what's underneath," he said.

IBM envisions the creation of an IBM-specific Common Transport Access for SNA and OSI protocol instead of the ISO standard TSAM. Within it, IBM will provide a set of Transport Semantics capable of identifying data types, substituting headers, and routing SNA and OSI protocols to IBM transport-level gateways.

"It's not a simple, mechanical protocol conversion," Shelton said. "[The Common Transport Access] will have to refer to a directory and do address changes."

Unlike Unisys, which plans to announce products based on its strategy next month, Shelton declined to give any estimate when IBM will roll out products based on the strategy.

"We know how to do it, but it's complicated," Shelton said. He added that IBM isn't likely to ship products supporting this strategy any time this year.

On the network management side, IBM vowed to support both SNA and OSI through the OSI standards Common Information Management Service and Common Management Information Protocol.

"Statements that they're going to adopt OSI management are excellent," said Donald Sheppard, senior consultant at Toronto-based Protocols, Standards & Communication, Inc., who attended the briefing.

"Pretty well everybody but IBM is implementing OSI Transport Services," Sheppard said. "What [IBM] is saying is [that] there is something new needed." ▢

Fibermux may boost ADC mart presence

continued from page 9

aggressively into the private net market. Along with the addition of Fibermux, ADC has spent about \$50 million on three other acquisitions during the past two years.

ADC acquired Kentrox Industries, Inc., a maker of data service unit/channel service units, in July 1989 for about \$30 million. It also purchased Teling, a Richardson, Texas, start-up specializing in Synchronous Optical Network and DS3 technologies, for about \$5 million in June 1990. And last July, ADC bought American Lightwave Systems, Inc., a maker of cable television-over-fiber and videoconferencing equipment, for about \$12 million.

Although ADC is bolstering its presence in private net markets, the company is still committed to the public network market as well, Gallogly said.

"The public network market doesn't have the same growth potential as the private market, but with deregulation in other countries, there will be more opportunities in public networking," she said.

Andy Schopick, an independent analyst in Southport, Conn., applauded the move.

"The acquisition is a reflection of ADC's commitment to new technologies and new markets," he said. "Fiber is the way of the future, and ADC has an otherwise mundane and maturing product line. It's a good move on ADC's part to step up its pace of investment in a new direction." ▢

Industry Briefs

continued from page 9

better "focus its capital and resources in areas it feels have greater potential."

Apple to pare staff. Apple Computer, Inc. last week said it will reduce its work force by 10%, or about 1,560 employees, in an effort to cut costs. The work force reduction, which will be accomplished by layoffs and attrition, will affect all job classifications worldwide and take place mostly during the current fiscal quarter that ends June 28. Apple's need to cut costs is partly due to the company's strategy to sell more lower priced products.

NCR inks distributors. NCR Corp. announced at Comdex/Spring '91 in Atlanta last week that it has signed agreements with six regional and nationwide distributors to market its new WaveLAN wireless local-area network system in the U.S. and abroad.

The distributors are Arrow Electronics, ATV, Inc., GBC Distributors, Ingram Micro, Vitek Systems Distribution and Wyle Labs.

WaveLAN is a wireless LAN interface

card that eliminates the need for wiring to connect personal computers. It transmits data at 2M bit/sec and is compatible with Novell, Inc.'s NetWare network operating system.

Firm buys LAN integrator. CompuServe, Inc. recently announced it has acquired SEARA Information Strategy Corp., a local-area network systems integrator based in McLean, Va. Terms of the agreement were not disclosed.

SEARA follows MicroSolutions, Inc. of Dallas as the second LAN systems integrator acquired by CompuServe in the last nine months. The acquisitions are part of CompuServe's strategy to serve users' LAN needs by selling and supporting LAN equipment plus providing wide-area interconnection services via its public packet network.

The company is in the process of training its sales people to support the LAN business at offices in Boston, Dallas, Houston, New York and Washington, D.C. Eventually, CompuServe plans to have offices for its new LAN Systems Integration Group in every major U.S. city, said Robert Massey, executive vice-president of CompuServe's Network Services Division. ▢

People and Positions

continued from page 9

RAD Network Devices, Inc. last week announced that **Gershon Schatzberg** has been promoted from the position of systems engineering manager to vice-president of engineering. Schatzberg will have responsibility for all engineering and technical support for sales of RAD equipment in the U.S.

RAD Network Devices, headquartered in Huntington Beach, Calif., is a manufac-

turer of bridge and router networking products.

Armando Geday, formerly product line manager of facsimile modems at **Rockwell International Corp.**'s Digital Communications Division, was recently promoted to the position of director of marketing for modem systems.

In his new position, Geday will be responsible for the marketing of modem systems and controllers as well as the marketing of application engineering for the Newport Beach, Calif.-based division. ▢



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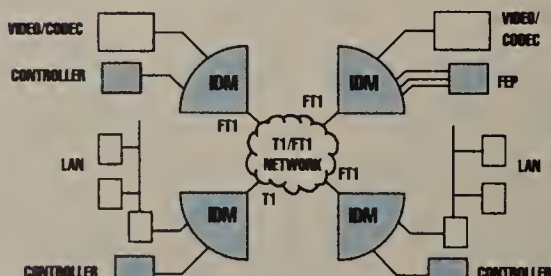
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Worth Noting

AT&T last week said it has now filed 89 custom network plans for more than 125 customers under Tariff 12.

AT&T proposes additional small-business offerings

Wants to add flat-rate voice and 800 services.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T has proposed adding a new flat-rate voice service and a discounted 800 service to its recently unveiled lineup for small-business users, but the carrier may face some regulatory hurdles in rolling out these deals.

Earlier this month, AT&T introduced AT&T Small Business Option and 800 CustomNet. Small Business Option is a flat-rate deal for outbound voice that allows users to purchase 100 minutes of usage for \$20, regardless of when or to where calls are made. 800 CustomNet offers discounts and a single bill for 800 calls to one or more locations.

With the two new services, AT&T now offers small-business customers choices ranging from a bundled package of inbound, outbound and international calling to discount plans for individual services. The carrier's small-business services are targeted at users spending between \$50 and \$2,000 per month. These services are a direct response to MCI Preferred, the small-business offering from MCI Communications Corp., according to AT&T.

MCI Preferred offers users volume discounts on a variety of services, including inbound and outbound calling bundled in a single package with a single bill.

AT&T rolled out two other small-business services earlier

this year that covered multiple services at discounted rates, much like MCI Preferred. CustomNet allows customer discounts and a single bill for outbound voice, international, calling card and teleconferencing calls. A month later, AT&T rolled out an enhanced version, CustomNet Plus, which adds 800 service and allows users to forward that usage to volume discounts.

AT&T's announcement of Small Business Option and CustomNet 800 this month may indicate that AT&T is anticipating regulatory problems with the more inclusive packages and is scaling back on the deals it can offer small-business users.

An AT&T spokesman said the new single-service offers are intended to give customers additional choices and are not substitutes for its earlier announcements. But AT&T's CustomNet and CustomNet Plus have been attacked by rival vendors. The problem, opponents say, is that those packaged offerings include international and 800 services — markets in which AT&T has been judged dominant.

The fear is that AT&T could use its dominant position in the 800 or international areas to leverage sales of other services. CustomNet Plus raises the same issues as the SDN deals, according to rivals. The FCC is reviewing AT&T's proposed service and the complaints that were filed. □

WASHINGTON UPDATE

BY ANITA TAFF

Plea for telecommuting study. Sen. Conrad Burns (R-Mont.) is urging the Department of Energy and Department of Transportation to produce a study on the benefits of telecommuting. He is asking the agencies to estimate how much telecommuting would reduce the number of traditional commuters, how many lives would be saved due to a reduced number of auto accidents, how telecommuting would affect the environment, as well as how much and what type of energy could be saved. The federal government is already experimenting with a telecommuting project slated to last two years.

Who's to blame? AT&T denied in a recent filing with the Federal Communications Commission that it had mistaken a toll-fraud problem at Perkin-Elmer Corp. as billing errors in 1989 and 1990. Perkin-Elmer filed a complaint with the FCC in March because it said that despite assurances a credit would be issued, AT&T is attempting to hold the firm responsible for more than \$250,000 in toll-fraud charges run up during the time the carrier was studying the matter. The FCC is looking into the problem of toll fraud in a separate proceeding. □

Call-by-call service selection pricing

Carrier	Charges	
	Onetime	Per change
AT&T	None	None
MCI Communications Corp.	\$250 per PRI	\$200
US Sprint Communications Co.	\$250 per PRI	\$200

PRI = Primary Rate Interface

SOURCE: FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPERT

Early users applaud ISDN PRI call-by-call

Capability is paying off with increased trunking efficiency, access flexibility, substantial savings.

By Bob Wallace
Senior Editor

Users of ISDN's Primary Rate Interface (PRI) call-by-call service say the feature has improved trunking efficiency, boosted access flexibility and saved money.

Call-by-call service selection enables customers to use a T-1 pipe with an Integrated Services Digital Network PRI to access multiple switched services from a carrier point of presence.

Unlike standard T-1 local access pipes in which channels have to be dedicated to the support of specific services, call-by-call enables customers to use PRI channels to support a mix of services on an as needed basis.

Call-by-call service selection has, for example, enabled Schindler Elevator Corp. to reduce from 40 to 23 the number of 64K bit/sec channels needed to support incoming and outgoing calls at a facility in North Carolina. Before call-by-call, Schindler supported inbound and outbound calls on separate T-1s.

Call-by-call has enabled Schindler to consolidate traffic from two 1.544M bit/sec lines onto a single T-1 link, according to Edward Hodgson, Schindler's communications manager.

The success of call-by-call at the site has encouraged Hodgson to use the service at the company's Morristown, N.J., headquarters. He now plans to equip every new AT&T Definity or Northern Telecom, Inc. Meridian 1 private branch exchange he buys over the next four to five years to support PRI and use call-by-call.

The company plans to install new switches at a rate of four or five locations a year for several years. "We're sold on call-by-call and expect significant savings at every site," Hodgson said.

American Creditors Bureau Companies has also realized savings by integrating access lines with call-by-call. In fact, the com-

pany justified the cost of two PRI links for its Phoenix headquarters on access savings alone.

The collection agency replaced 72 local-access lines with two PRI links — which have 46 traffic-bearing channels — and is saving \$6,000 to \$9,600 a year using call-by-call service.

While some users are able to cast off costly access lines, others are able to free up circuits on existing links for future use.

Porsche Cars of North America, Inc. is using call-by-call to make more efficient use of two PRI links between its U.S. headquarters in Reno, Nev., and an AT&T point of presence a few miles away. The service has enabled Porsche to reduce from 12 to two the 64K bit/sec channels needed on the second link to access different dial-up services.

"We couldn't get down to the level where we could eliminate our second T-1, but we freed up bandwidth that can be used for traffic growth and applications," said Steve Backe, Porsche's computer operations and telecommunications manager.

Although many users have realized savings from call-by-call service selection, some AT&T ISDN customers are not employing the service primarily because they use multiple carriers' services at their call centers.

This is the case with Union Pacific Railroad Co., which operates a 400-agent national customer service center in St. Louis. The center uses an AT&T PRI link for some incoming calls and U.S. Sprint Communications Co. lines for outgoing calls. The facility handles 17,000 to 18,000 incoming calls and 5,000 to 7,000 outgoing calls a day. "Given the outages AT&T and Sprint have had over the last few years, we just don't feel comfortable putting all our eggs in one basket," said Bruce Meadows, Union Pacific customer service manager. □

Carrier Watch

AT&T last week announced that it has signed two new Tariff 12 custom voice/data network deals. Choice Hotels International and its parent company, Manor Care, Inc. of Silver Springs, Md., signed a three-year, \$30 million contract, while Honeywell, Inc. of Minneapolis signed a \$20 million contract for an unspecified length of time.

AT&T will provide Choice Hotels with a custom voice/data network that serves the company's corporate headquarters, as well as hotels, nursing homes and other company properties.

Choice Hotels franchises include more than 2,500 hotels, inns and resorts under the Comfort, Quality, Clarion, Sleep, Rodeway, Econo Lodge and Friendship names.

AT&T will provide 200 Honeywell locations with interstate and international voice and data communications.

Included are inbound and outbound calling capabilities as well as calling card services for Honeywell employees that travel frequently.

Honeywell said that once fully implemented, the deal is expected to save the company about \$5 million annually. AT&T had not yet filed Honeywell's option at press time.

AT&T recently reduced prices for intrastate business services by roughly \$5 million. The carrier reduced prices for three of its toll-free calling services — AT&T 800, Megacom 800 and Readyline 800 — by an average of 7.4%. AT&T lowered prices for its Software-Defined Network offering and AT&T WATS as well. □

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Worth Noting

“Until [asynchronous transfer mode] switching is working in at least a beta-test environment, you can't take it seriously.”

Rick Malone
Principal
Vertical Systems Group
Dedham, Mass.

IDEA orchestrates software upgrade for controller line

Concert line supports broader mix of terminals.

By Paul Desmond
Senior Editor

TEMPE, Ariz. — IDEA recently announced a software upgrade for its Concert IBM- and Digital Equipment Corp.-compatible controllers that adds support for IBM minicomputer terminals and broadens the number of IBM 3270 devices the units support.

The IDEA Concert controller is available in three models, each of which can be configured as an IBM 3174-compatible controller or DECServer-compatible terminal server.

The new Release 1.2 of the controller's software also lets the IDEA Concert emulate an IBM 5394 controller, which gives it support for terminals attached to IBM Application System/400s, System/36s or System/38s.

Also new with Release 1.2 is support for 64 3270 devices, up from 54, when configured as an IBM 3174-compatible controller. Each attached device can simultaneously link to any combination of four IBM System/370 hosts or DEC VAXes, said Suzanne Harbster, IDEA's product line manager for the controllers.

When configured as a mid-range IBM 5394 controller, dubbed a Concert 394, the controller supports 42 IBM 5250 terminals, whereas the 5394 supports only 16, Harbster said. The Concert 394 can also attach to

any combination of four IBM minicomputers, whereas IBM's controller supports only one.

Cummins Southern Plains, Inc. of Arlington, Texas, a beta user of Release 2.1, said the company could replace two IBM 5294 controllers with a single Concert due to the number of devices the Concert 394 supports.

Ruthie Day, systems operation manager for Cummins Southern Plains, said the two 5294s were attached to a modem sharing unit that enabled them to share a single 9.6K bit/sec leased line. Both 5294s had the maximum eight devices attached, and response time was so slow that terminal screens were refreshed only two or three lines at a time.

A single Concert 394 supports all 16 5250 devices with room to spare and offers vastly improved response time, Day said.

Release 1.2 is available now and is included in the price of the IDEA Concert controllers. Configured as a mid-range device, the controllers vary in price from \$3,295 for a machine that supports 14 5250 devices to \$9,695 for one that supports 42 devices.

IBM 3174-compatible models range from \$3,245 for a model that supports 18 3270 devices and 16 asynchronous devices to \$11,245 for one that supports 64 3270 terminals and 32 asynchronous devices. ■

General DataComm takes wraps off two new DSUs

By Paul Desmond
Senior Editor

MIDDLEBURY, Conn. — General DataComm Industries, Inc. recently introduced two new data service units (DSU) — one with an integral four-port multiplexer and another that supports a 64K bit/sec clear-channel capability.

The first DSU, the HiCaliber NMS 464, has an integral four-channel multiplexer and supports multipoint and point-to-point configurations. An optional four-port expander card lets the device support six channels in multipoint configurations and eight point-to-point channels.

Compatible with AT&T and most other digital data services (DDS), the NMS 464 operates at an aggregate rate of up to 56K bit/sec in multipoint mode and up to 64K bit/sec in point-to-

point configurations.

Scheduled for availability in the third quarter of this year, the NMS 464 costs \$3,295.

General DataComm's other DSU is the DataComm 500 G/UXR, which is a universal extended range DSU, meaning it works with V.32 and RS-232 physical interfaces and runs at the full range of DDS line speeds, from 2,400 to 64K bit/sec. The device can also automatically adapt to the speed of the DDS line to which it is attached.

The DataComm 500 G/UXR lets users take advantage of the secondary channel offered on some DDS lines to employ a full 64K bit/sec clear channel.

Available now as a stand-alone or rack-mountable unit, the DataComm 500 G/UXR is priced starting at \$1,045. ■

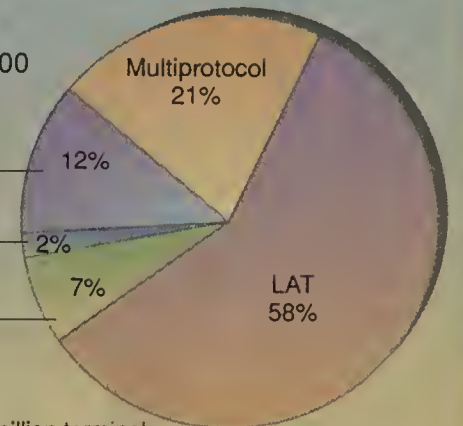
Terminal server protocol support

Terminal server ports shipped in 1990: 2,479,200

Telnet (TCP/IP)

Xerox Corp.'s XNS

Other



More than half of the almost 2.5 million terminal server ports shipped last year support Digital Equipment Corp.'s LAT protocol.

LAT = Local Area Transport

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

DEC to expand scope of terminal servers

New generation of devices could off-load routine tasks from CPUs and preserve net bandwidth.

By Jim Brown
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week said it is developing a new generation of terminal servers and exploring how to use the devices to off-load tasks from host CPUs in order to preserve network bandwidth.

The new terminal servers could off-load routine functions such as screen generation tasks from host CPUs, thus enabling users to reduce host processing loads and put off CPU upgrades.

The product line will be based on a new hardware architecture and will include support for terminal-to-host connectivity protocols other than DEC's successful Local Area Transport (LAT) (see graphic, this page).

DEC has added support for Transmission Control Protocol/Internet Protocol's Telnet virtual terminal protocol to its DEC-server 300 and said all models in the next generation of terminal servers will support Telnet and Open Systems Interconnection's Virtual Terminal Protocol (VTP).

LAT is a connection-oriented protocol and is only useful when connecting terminals to local hosts. Telnet and VTP can use a connectionless protocol to enable terminals to access remote hosts.

“We're looking at VTP or Telnet as the wide-area protocol for terminal-to-host connectivity,” said Lee Cooper, DEC's networks marketing manager.

DEC is designing the hardware architecture for the new line of terminal servers and will likely introduce the products within the next two years, Cooper said. Because the product has not been developed, pricing information

was not available at press time.

Terminal servers are stand-alone devices that connect a cluster of terminals or microcomputers emulating terminals to an Ethernet local-area network.

DEC's current terminal servers — DECservers 200, 300, 510 and 550 — are among the firm's best selling products.

But those products have hardware limitations such as unexpandable memory and no disk drive, which prohibit them from supporting advanced software-based functions. The new hardware platform will have more memory than existing products, which range from 384K to 1M byte. It will likely have a disk drive that will enable DEC to simply upgrade functionality with new software releases.

“We're recognizing that software is becoming more predominant and the capabilities of software applications is really where the industry and market are going to go,” Cooper said.

For instance, Cooper said DEC is examining whether it should develop software that puts screen generation tasks on a terminal server. Doing so would enable the server to download a screen image to an attached terminal and limit the host to providing only the data needed to fill in fields on the screen. Currently, the host must supply both the screen and the data, a process that chews up host processing cycles and congests the network.

DEC is also considering outfitting terminal servers with peer-to-peer routing software that will pass traffic from a microcomputer attached to one terminal server to a microcomputer attached to another terminal server. ■

Data Packets

Systems Center, Inc. of Reston, Va., last week announced a new version of its Network DataMover (NDM) file-transfer software that runs on an IBM Application System/400, enabling it to automatically conduct file transfers with an IBM MVS mainframe.

The NDM-400 works with Systems Center's existing NDM-MVS Release 4.0 to let users conduct scheduled file transfers directly from an AS/400 application to a mainframe, such as for electronic data interchange, centralized system maintenance or disaster recovery.

NDM-400 is available now and is priced between \$1,000 and \$12,000

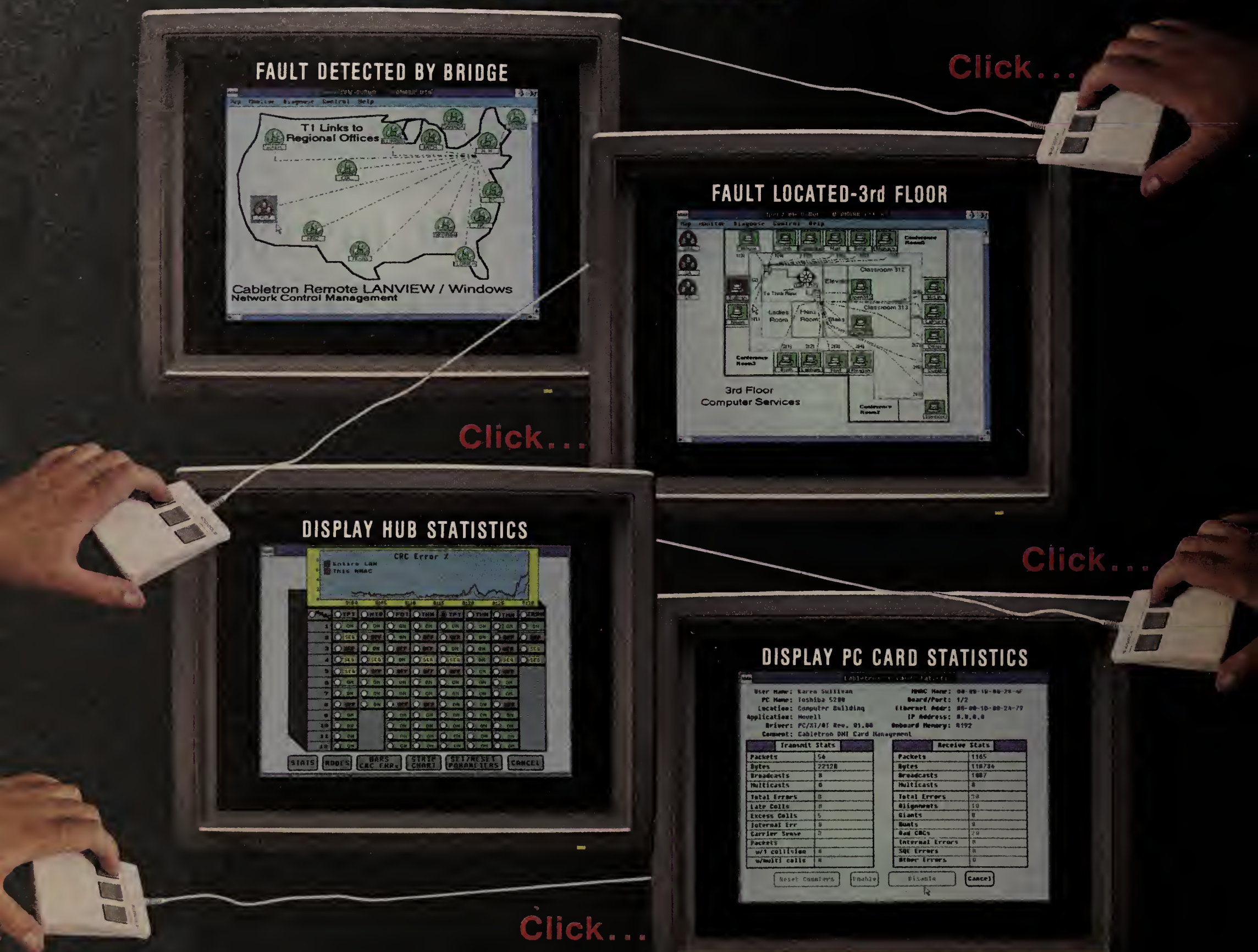
DigiBoard, Inc. of Minneapolis last week announced new hardware and software that lets Unix-based personal computers act as high-end facsimile machines.

DigiBoard's new DigiFAX System lets a personal computer support such fax features as multipoint broadcasting and delayed scheduling.

The system comprises a single communications board with either one or two fax modems, plus software that lets the system send Group III faxes directly from word processing or spreadsheet applications.

Scheduled to ship in August, the DigiFAX System costs \$995 for a single-channel version and \$1,495 for a dual-channel system. ■

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Worth Noting

“It may seem like we’re in the middle of a [Microsoft Corp.] Windows jubilee. But about a month ago, IBM announced OS/2 2.0, and Windows runs better under OS/2 2.0.”

Amy Wohl
President
Wohl Associates
Winewood, Pa.

Cabletron will use Touch software for CMIP support

Foresees growing demand for the OSI mgmt. tool.

By Caryn Gillooly
Senior Editor

ROCHESTER, N.H. — Cabletron Systems, Inc. recently began licensing Touch Communications, Inc.’s Alliance OSI network management components with the intention of adding the Common Management Information Protocol (CMIP) to its management and interconnection products.

CMIP is the management protocol specified in the Open Systems Interconnection protocol stack, just as Transmission Control Protocol/Internet Protocol networks use the Simple Network Management Protocol (SNMP).

SNMP, however, is only used to collect management information from devices on the network, while CMIP will let customers communicate and pass information between different enterprise network management systems.

According to Cabletron, based here, the agreement gives the firm licensing rights to incorporate Touch Communication’s software into its Remote LAN-View/Windows and Spectrum network management products,

along with its entire line of Ethernet, token-ring and Fiber Distributed Data Interface products.

Roger Dev, Cabletron’s director of software development, said the company’s Spectrum management product will be the first to include support for CMIP, although, ultimately, all of the its products will support the management protocol.

“We haven’t seen serious market demand for OSI systems yet, but we expect it to come,” he said. “Three years out is when we’ll see significant deployment of CMIP-based management systems. But with Spectrum, we want to lead the market, and we expect to have that support within a year.

“Although we also intend to port CMIP to the rest of our product line, that support will be based on customer demand and will not be included immediately,” Dev added.

Current Spectrum beta-test sites backed up Dev’s contention, saying CMIP is important in the long run but is not crucial in today’s networks.

(continued on page 18)

New Novell access server supports Macs, X.25 nets

By Caryn Gillooly
Senior Editor

PROVO, Utah — Novell, Inc. recently released a new version of its remote network access software that comes with support for Apple Computer, Inc. Macintosh systems and X.25 packet switched networks.

Novell’s NetWare Access Server Version 1.2 now lets users at remote Macintoshes log onto a NetWare local-area network via a dial-up connection and launch DOS applications as if the workstation were locally attached. The addition of X.25 support gives users an additional transmission option to dial into a NetWare LAN.

NetWare Access Server is software that resides on a dedicated Intel Corp. 80386-based personal computer attached to a NetWare LAN, providing dial-in users with access to all services and files available on the network.

The additional support for remote Macintoshes is a result of the NetWare Access Server’s new ability to be used as a DOS appli-

cation server on the local NetWare LAN. This lets the administrator load DOS applications onto the server, letting either local or remote Macintosh clients run both DOS and Macintosh applications on the same machine. Previously, Macintosh users could not run DOS applications from their Macintoshes.

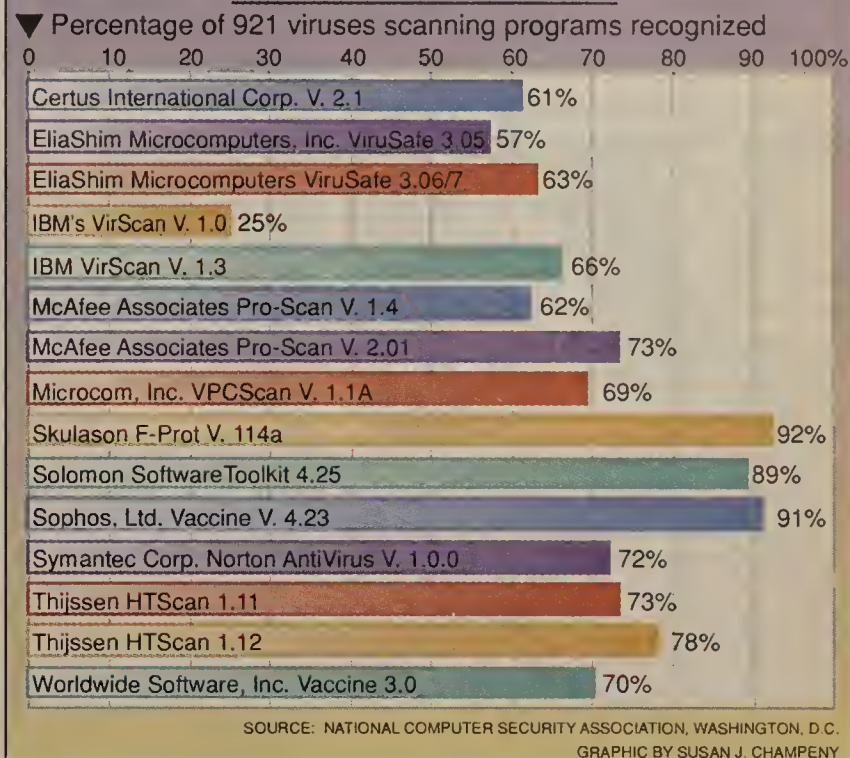
“Many [Macintosh] customers have had to maintain a DOS-based PC on their desk just to gain access to the DOS application on their company’s NetWare networks,” said Steve Nelson, director of product marketing for Novell’s Macintosh products.

Nelson pointed out, however, that the LAN must be running NetWare for Macintosh 3.0 to get the dual DOS/Macintosh capability.

NetWare Access Server Version 1.2 also includes enhanced support for IBM 3270 terminal emulation and enhanced NET-BIOS support, and will let network administrators run the NetWare Access Server console from a local or remote workstation.

(continued on page 18)

Recognizing viruses



Net managers focus on virus prevention

As viruses spread at alarming rates, users are shifting strategies to head problem off at the pass.

By Salvatore Salamone
Features Writer

TINTON FALLS, N.J. — As new viruses increase at an exponential rate and the ability of virus protection software to recognize existing viruses remains modest at best, network managers are shifting their virus defenses from a search-and-destroy strategy to one of preventing their introduction to networks.

Viruses, once considered a minor annoyance, are becoming a growing problem. A study commissioned by Certus International Corp., a Cleveland vendor of virus protection software, found that 50% of the 2,500 sites studied with 400 or more microcomputers have been infected by viruses and the percentage is growing rapidly.

Petri dish environment

Much of the increasing virus threat can be attributed to local-area networks. “The LAN environment is a petri dish for the incubation of viruses,” said Patrick Springer, a consultant with the Needham Heights, Mass., management consulting firm Computer Task Group, Inc.

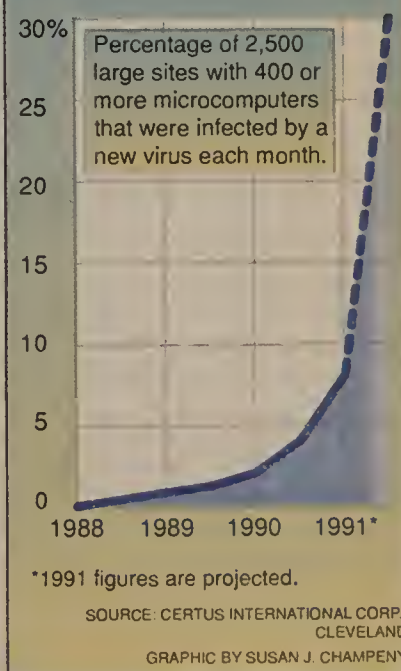
The main source of LAN viruses is bootleg software and users exchanging floppy disks, said Tom Patterson, technical director in the information security business unit of Centel Federal Systems, Inc., a systems integrator in Reston, Va.

The traditional approach to combating LAN viruses is to first

detect the code and then try to eliminate it. But finding the viruses is no easy task.

In tests conducted by the National Computer Security Association (NCSA), a Washington, D.C.-based nonprofit computer security organization, only two of 21 commercially available virus scanning programs could recog-

Virus infection rates



nize 90% of files infected by the 921 known viruses.

In the NCSA study “Virus Scanners: An Evaluation,” more than half of the 21 programs tested could not recognize a quarter of the known viruses.

To make matters worse for network managers, the number (continued on page 18)

Netnotes

GUPTA Technologies, Inc. recently announced SQLRouter for Application System/400, software that gives applications developers with GUPTA’s SQLWindows application development system access to data bases on IBM’s mid-range computer.

Because SQLWindows applications can already access information in IBM’s DB2 data base and support for IBM’s OS/2 Extended Edition is expected to be announced in the near future, SQLWindows users will soon have the ability to develop cooperative processing applications for every system under IBM’s Systems Application Architecture umbrella.

SQLRouter for AS/400 will take advantage of IBM’s enhanced Remote SQL software and allow any Windows 3.0-based application to access AS/400 data bases through GUPTA’s application program interface.

SQLWindows also works with GUPTA’s SQLBase Server, Oracle Corp.’s server products and Novell, Inc.’s Btrieve data bases.

In addition, GUPTA has announced support for Microsoft Corp.’s SQL Server, Hewlett-Packard Co.’s ALLBASE/SQL and Informix Software, Inc.’s SQL data base.

SQLRouter for AS/400 is expected to be available by year end.

Pricing for SQLRouter for AS/400 has not yet been determined. □

Net managers focus on virus prevention

continued from page 17

of viruses is growing at an increasing rate. The NCSA estimates that this year, new viruses will be introduced at a rate of six per day, compared to one every two days last year, making them more difficult to identify.

One reason for the rapid growth in the number of new viruses is that it's getting easier to create new ones. "Many viruses are sent out [to bulletin boards] with source code or with a compiled and uncompiled version," Patterson said. This allows others to easily modify existing viruses or create new strains.

In most cases, these modified viruses

will not be detected by virus scanning software even if the program could identify the original virus. "Virus [scanning] programs can search for today's viruses," he said. "But it's tomorrow's virus or the modified virus that is the problem."

Finding a cure

Clearly, virus protection software alone is not enough. That fact was one of the driving forces behind the creation of SiteLock, a software license metering tool and virus protection package for LANs, which was introduced here by Brightwork Development, Inc.

SiteLock allows a net manager to prevent unauthorized software from being executed from local drives. SiteLock is compatible with Novell, Inc. NetWare and runs under NetWare 3.X environments as a Network Loadable Module (NLM) and on NetWare 2.X as a value-added process (VAP).

The NLM/VAP version continually interacts with memory-resident modules installed on each LAN workstation to monitor software usage and to detect any unauthorized software programs.

SiteLock acts as a shield between the commands typed by the user and the network. The LAN administrator creates a list of authorized programs and for each one builds a blueprint containing the file name, byte size, owner name and date of cre-

ation.

Prior to running a program, SiteLock checks them against a clean, registered copy of the software and notifies users of any change. If the local drive version does not match a blueprint of the clean file, the local program cannot be loaded.

With this feature, it is less important for users to keep up-to-date with the latest virus strains because the program is not searching for known viruses.

"The local drive lockout feature is neat," said Lee Lepore, a net manager at Lockheed Sanders Information Systems Division in Nashua, N.H. "This helps us prevent virus infections."

The lockout feature, combined with the file checking feature, is key to preventing viruses from infecting a net. They solve the two major problems — introduction of a virus onto a LAN and identification of a virus — that net managers face in battling viruses on LANs.

For more information about viruses, call NCSA's bulletin board, which has a large section on viruses, at (202) 364-1304 or the National Institute of Standards and Technology's computer security bulletin board at (301) 948-5717. **■**

Novell access server supports Macs, X.25

continued from page 17

Version 1.2 of the software now supports 16 IBM 3270 terminal sessions vs. just six sessions previously. It lets a remote user establish a 3270 session with an IBM host via a NetWare Systems Network Architecture Gateway.

Version 1.2 also now lets users on all 16 remote sessions run NETBIOS applications concurrently. Previously, only one user at a time was able to run Novell's NETBIOS emulator.

Finally, the new version lets the network manager access the NetWare Access Server from any location, local or remote. It also includes new network management capabilities that let the administrator define user profiles to restrict the number of sessions per user, set the time available on the system and set remote access procedures to run automatically.

NetWare Access Server Version 1.2 is available now for \$2,395. According to Novell, customers that purchased NetWare Access Server Versions 1.0 or 1.1 can upgrade to the new software release for \$895. **■**

Cabletron to use Touch software

continued from page 17

Delmarva Power & Light Co., a gas and electric utility company based in Wilmington, Del., is using Cabletron's Spectrum management system to control its Wellfleet Communications, Inc. routers and Cabletron devices and to conduct limited monitoring of its Banyan Systems, Inc. file servers and terminal servers, checking on whether these devices are functioning.

"We care that Cabletron will have CMIP support," said John Scoggin, supervisor of network operations for Delmarva. "In fact, we're waiting on another network management product that is supposed to have CMIP. We hope to integrate these network management products using some protocol. Maybe it will be CMIP; we'll see how things work out." **■**

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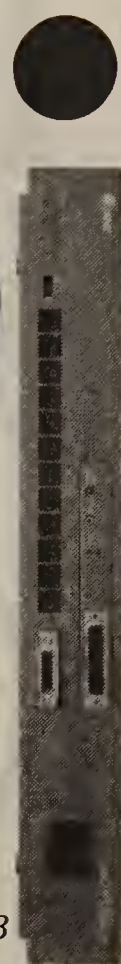
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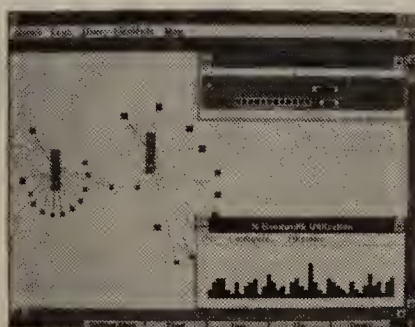


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Intrusion Control	Yes	Yes — MMAC-3 No — MRXI-2	Yes
Eavesdrop Prevention	Yes	No	No
Map Generation	Yes	Yes	Yes
User Movement Alarming	Yes	No	Yes
List Price/Port*	SmartHUB \$253	MMAC-3 \$391 MRXI-2 \$338	LattisNet® Series 3030 \$525 LattisNet® 2310 \$319

*Based on 36 ports including network management.

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DuWayne Peterson
Executive vice-president
of operations, systems
and telecommunications
Merrill Lynch & Company, Inc.
New York

Association Watch

The **Communications Managers Association (CMA)** voted unanimously last month to accept vendor companies as sustaining members. Those eligible for sustaining membership include vendor companies involved in the production, sale, rental or provision of telecommunications services, equipment or consulting support. No vendor, however, will be given voting privileges.

Discussing the rationale for the decision, CMA President Ron Kopitowsky said, “In rethinking our relationship with vendor entities, we now realize that if we are to be successful as communications managers, we must ‘partner’ with these suppliers.”

The Long Island chapter of the **Institute of Electrical and Electronics Engineers** recently presented its annual Wheeler Award for outstanding contribution to telecommunications networks to Ivan Frisch of Polytechnic Institute of New York.

Frisch, director of the Center for Advanced Technology in Telecommunications at the institute, was a founder of Network Analysis Corp. and led teams in projects such as the development of the Advanced Research Projects Agency Network. He is a fellow of the IEEE, a Guggenheim fellow and a Ford Foundation resident at AT&T Bell Laboratories. □

Chevron HR systems move to cooperative platform

User builds new applications on SAA foundation.

By **Wayne Eckerson**
Senior Editor

SAN FRANCISCO — In a move to give human resources (HR) managers faster access to employee data, Chevron Corp. next month will convert its host-based HR applications to cooperative processing systems based on IBM's Systems Application Architecture (SAA).

The SAA-compliant applications will enable OS/2 workstation users running Microsoft Corp.'s Windows 3.0 or IBM's Presentation Manager to access a variety of HR data through multiple windows on a single screen instead of having to call up separate host-based applications on their 3270 terminals.

The company will also provide easy-to-use tools that enable specially trained users to modify screen layouts, customize data formats and views, and alter edit and update functions. This will speed application development and ensure that applications conform to users' needs.

“Under the old thinking, whenever there was a problem, users would come to [IS] which would develop an application,” said Jay Stright, manager of employee systems at Chevron. “We don't think that way anymore. Now we are putting together a portfolio of tools that will allow businesspeople to manage data and develop applications to run their business.”

The new system, which is cur-

rently being pilot-tested, will be made available next month to Chevron HR managers equipped with OS/2 workstations.

From old to new

Chevron's HR system, dubbed Emphasizing People in Chevron (EPIC), consists of a series of relational data bases that reside on an IBM mainframe here. More than 1,300 users in 150 HR departments nationwide access information on EPIC using 3270 terminals or workstations emulating 3270 terminals.

EPIC supports more than 150 applications, including employee records, payroll, organizational charts, training programs and benefits plans. Currently, users can only access one application at a time when gathering or updating information. This can be time-consuming since HR managers often need to compile information from different applications.

“The 3270 environment doesn't give people the ability to get at data the way they want,” Stright said. “Our users said they would like to access data as if they were pulling out pieces of paper from their desk drawers.”

Under the new system, users will access EPIC via workstations running OS/2 Extended Edition and cooperative processing software from Tesseract Corp., a software development firm here. The client portion of the Tesseract

(continued on page 22)

Network planning manager

Job description:

- Responsible for long-term planning to ensure network capacity meets current and future net requirements.
- Defines and develops methodology to ensure standardization of all products at each facility.
- May serve as liaison with vendors and consultants or as a functional manager to network analysts and technicians.

Requirements:

- Job typically requires 8 to 10 years of engineering and operations experience.

Compensation (national averages):

Salary: \$65,200
Bonus: \$8,800



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: WILLIAM M. MERCER, INC., DALLAS

Network planners taking on vital role

Rapid emergence of new technologies, growing importance of networking heighten job visibility

By **Maureen Molloy**
Staff Writer

When City National Bank in Los Angeles outsourced its computer operations last winter, Michael Trivich faced the difficult job of completely redefining the bank's network strategy.

“There's been a 180-degree shift in direction, so it's been chaotic trying to rework the entire network strategy,” said Trivich, vice-president of network planning. “I'm in the process of squeezing requirements out of upper management and end users before I can present a long-range plan.”

Trends such as outsourcing, as well as the growing business importance of networking, have added new layers of complexity to the job of network planner and given planners a more strategic role within large corporations. Planners face a number of political and technological challenges on the path to developing a winning network strategy.

Ted Lipsky, network planner at the University of Miami in Coral Gables, Fla., sees the network planner as nothing less than the focal point of an entire net.

A planner “must evaluate technology, assess end-user requirements, understand corporate goals and then figure out a way to implement a network strategy — cost-effectively — that can best accommodate all those elements,” he said.

Network planners such as Lipsky and Trivich say the most difficult part of their job is keeping abreast of the new technologies and convincing upper management that those technologies

can play a key role in companies' long-term strategies.

Most planners say they keep on top of technology trends primarily by reading trade publications. They also keep in frequent contact with vendors' research and development teams.

“A network planner's priority is not to implement a particular project today but to see how a given project will affect the future functionality of the network,” said James Pulfrey, network planning manager at US West Communications, Inc., a subsidiary of US West, Inc. “By definition, we are big picture- and future-focused.”

That long-term view can lead planners to promote strategies that initially meet with resistance. Mel Moulton, network planner at Rockwell International Corp. in Dallas, began his job as a network planner eight years ago just as the idea of linking personal computers to share information began to emerge.

“I was a heavy promoter of LANs and the growth potential of personal computers over dumb terminals,” he said. “But it took a lot of time and convincing to get others in the organization enthusiastic about the technology.”

“It's easy for a planner to see what's coming down the pike, or at least the direction technology is moving in. We design the network with those ideas in mind,” Moulton added. “What's not easy is getting management's ear — and sometimes other MIS people — to see that current possibilities will quickly be overshadowed by tomorrow's technology.”

(continued on page 22)

EXECUTIVE BRIEFS

BY WAYNE ECKERSON

Day care network. Parents can identify the day care facility in their area that best meets their needs by browsing through an on-line network called the Child Care Database (CCARE), which contains more than 57,000 listings of day care centers nationwide.

CCARE is available through The Human Resource Information Network (HRIN), an on-line network used by more than 6,000 human resources managers nationwide. The CCARE data base is maintained by Care Connectors, Inc., a child care information referral service in Indianapolis.

Subscribers can search for day care centers in the CCARE data base by city, state, type of care provided and age of child accepted. In addition, the data base provides lengthy descriptions of each center listed, including name, address and fees. It also informs the user how many years of experience the primary care provider has.

A trial subscription to CCARE costs \$980 and includes software, training, documentation and a monthly newsletter. For more information, call (800) 421-8884. □

HR systems move to cooperative platform

continued from page 21

software, called HRMS Intuition, provides a graphical user interface based on IBM's Common User Access, an SAA component that defines how a user interacts with an application and a machine.

The client portion of HRMS Intuition communicates with HRMS Intuition server software, which in Chevron's case, sits on the host supporting EPIC. The server software retrieves or updates data in EPIC data bases in response to messages sent by the client software. Communications between the HRMS Intuition client and server takes place across Chevron's IBM Systems Net-

work Architecture net using LU 6.2 program-to-program protocols.

Currently, user workstations are linked directly to the EPIC host, forming a two-level cooperative processing platform. Eventually, Chevron will shift to a three-level platform by moving the Tesseract server off the host onto an independent processor, possibly on a local-area network. Chevron has yet to define the exact architecture, said Jim Gulley, senior HR systems specialist at Chevron.

In a three-tiered system, an HRMS Intuition server would field requests from the workstation, retrieve data from applications on the remote host and send it to the workstation, Gulley said.

HRMS Intuition provides a graphical in-

terface that lets workstation users view information as a series of index cards or panels. The index cards provide a quick, historical snapshot for scanning employee data, while the panels, which are viewed sequentially, provide additional information not on the cards. If users need to update information — for instance, to add an employee to the data base — they can click on the icon for form sets, fill out the necessary form and submit it to the host.

HRMS Intuition also contains a tool called HRMS Intuition Builder that lets designated users in each department modify the index cards, panels and form sets to meet the department's business needs.

"One person can plan and develop an application from beginning to end, signifi-

cantly reducing overall [development] cycle time," Gulley said.

Using Dynamic Data Exchange (DDE), users can download data from the EPIC host into other applications running on their workstation, such as spreadsheets, desktop publishing and word processing programs. DDE is a protocol that allows applications running under Presentation Manager or Windows 3.0, including HRMS Intuition, to exchange data in real time.

With HRMS Intuition and DDE, users can perform many functions on workstations that are now performed on host processors, such as compensation planning analyses. "By moving transactions from a host to workstations, we will save a significant amount of money," Stright said. ■

Network planners taking on vital role

continued from page 21

Planners say it can be difficult to put their strategies into action because they often have limited control over the various groups within information systems.

"Often, it appears that everyone is living in their own microcosm where the IBM boys care only about IBM, the DEC shop focuses solely on DEC and the voice side thinks only about telecom," said Robert Golobic, network planner at R.J. Reynolds Tobacco Co. "It's not easy tying the pieces together to develop a coherent plan that can be sold to the MIS director, much less to upper management."

Rockwell International's Moulton agreed. "I've had many administrators buying file servers on their own without understanding why or how it can adversely impact the network," he said. "Ultimately, the planners need more control over the structure and expansion of the net, as well as the hardware used, so there is a consistency across the entire net."

In addition, planners say they need to work closely with end users in different departments in order to understand their business needs. They also meet frequently with the planners in other divisions to ensure compatibility across the network.

US West's Pulfrey meets regularly with five other planners in the US West network that spans 14 states.

"Although there's a uniqueness in each network that the individual planner is responsible for, it's still critical for us to be aware of what each other is doing so we can maintain consistency for all internal customers," he said.

Most planners also lament the tightening of MIS budgets and directives from executive management to significantly trim return-on-investment (ROI) periods.

R.J. Reynolds' Golobic said the company, reeling from a leveraged buyout two years ago that saddled Reynolds with a large debt, recently slashed its MIS budget almost in half.

"We were once cash rich and hardly had a problem getting net plans OK'd, but today it's next to impossible to get long-term plans approved," he said. "Although we've shown how technology can advance Reynolds' long-term business goals, the projects just aren't getting approved."

City National Bank's Trivich said the situation is worsened by management's further demands for shorter ROI cycles.

"We're constantly prioritizing plans and trying to determine which projects will meet customer needs more efficiently and cost-effectively," Trivich said. ■



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World News

AT&T recently announced plans to offer International Accunet Digital Services (IADS) to Spain, pending approval by the Federal Communications Commission.

IADS is a point-to-point dedicated private-line service between AT&T international pricing points in the U.S. and overseas.

Initially, the carrier will support 64K bit/sec transmission speeds to Spain via digital undersea cables.

AT&T said the service to Spain will be provided in part by AT&T and Telefonica de Espana, the Spanish telecommunications administration. The monthly charge for the domestic half of a channel will run between \$3,400 and \$4,200 for service originating in the U.S.

Customers that order the service by June 30 will receive a 25% discount off AT&T's portion of the circuit charge during the first year of service.

IADS will give users another option in addition to digital satellite and terrestrial analog services to Spain already supported by AT&T.

US Sprint Communications Co. recently said it has agreed to supply Kuwait's Ministry of Communications with new network facilities and to provide new international services to that country.

Specifically, US Sprint will install a satellite earth station and international videoconferencing center that will be linked to the carrier's Meeting Channel videoconferencing service. □

AT&T to reduce toll-free service costs from Canada

Stays competitive with cuts in 800 service costs.

By Barton Crockett
Senior Editor

MORRISTOWN, N.J. — AT&T last week said it plans to cut charges next month for most of its international toll-free calling services from Canada by as much as 37%.

AT&T said it will reduce charges by 2.5% to 3% for AT&T Megacom 800 Service — Canada during daytime hours for most areas of the U.S. The carrier will also offer reductions of as much as 37% for Megacom service from Canada to Hawaii, while prices for Megacom service between areas immediately adjacent to the U.S.-Canadian border, such as between Toronto and Buffalo, N.Y., will remain the same.

Additionally, AT&T will reduce from \$10,000 to \$1,000 the minimum monthly usage costs on Megacom service from Canada

that users need in order to qualify for a 10% volume discount.

The carrier also will increase to 20% the maximum volume discount for Megacom service from Canada for monthly expenditures of \$25,000 and higher, compared to the current 15% discount for monthly expenditures of at least \$30,000.

"Canada has always been an important market for us and the largest market for outbound [international] calls [from the U.S.]," said Donna Brooten, marketing manager for AT&T's international 800 service here.

Brooten said AT&T is reducing charges to remain competitive with other carriers and to encourage more users to install toll-free service from Canada.

In addition to the Megacom service discount changes, AT&T is offering reductions ranging

(continued on page 28)

New company to offer int'l resale matching service

LONDON — Hoping to cash in on proposed U.K. regulatory changes that would legalize international resale, three consultants are forming a company that will match users seeking to sell extra capacity on their private networks with others looking to lease bandwidth at a lower cost.

Bandwidth Brokers International, Ltd., is a joint venture by U.K. consultants Peter Gentle and Brian Powell, along with Paul Kirvan, principal of Paul Kirvan & Associates in Turnersville, N.J. The firm will establish a data base of users seeking to lease and re-

sell capacity from private networks in the U.K. and across the Atlantic.

"The concept is very simple," Gentle said. "It's like a dating agency."

Bandwidth Brokers is planning to go into business in September, according to Gentle, and formally announce the service in June at the International Communications Association's 44th Annual Conference and Exposition in Anaheim, Calif.

To his knowledge, no other company performs a similar ser-

(continued on page 28)

International simple resale at a glance

Definition:

International simple resale is the provision for profit of basic switched or dedicated network services via international private lines.

Major countries that allow or plan to allow international simple resale of voice services:

Australia	New Zealand	U.K.
Canada	Sweden	U.S.

Areas where pressure for legalization of international simple resale is building:

European Community	Hong Kong	Japan
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Some companies that plan to enter the international simple resale market:

Cable & Wireless PLC, London
Lynx Technologies, Inc., Little Falls, N.J.
The Swirenet International, Ltd. division of John Swire & Sons, London
World Communications, Inc., New York
Securities Communications Networks, Inc., New Canaan, Conn.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: NETWORK WORLD AND COMPANY REPORTS

Easing resale bans may alter int'l nets

Legalization of international resale may encourage carriers to expand services and slash prices.

By Barton Crockett
Senior Editor

Efforts by regulators worldwide to abolish prohibitions on the resale of basic network services could eventually transform international communications by slashing service prices and enabling carriers to compete more fully in foreign markets.

By reselling both switched and dedicated network services via international private lines — a practice known as simple resale — resellers could drive global service prices down well below existing rates. In addition, legalization of simple resale would make it possible for global carriers to offer services to users in countries where they are currently prohibited from doing so.

"It would revolutionize international communications," said George Frylinck, senior vice-

president at World Communications, Inc. (WorldCom), an international carrier in New York.

Momentum building

Enthusiasm for international resale is building as regulatory prohibitions begin to fall. For example, Canada last summer eliminated most restrictions on the provision of switched voice services to users via private lines leased from the Telecom Canada consortium of carriers. This regulatory change applies to both domestic private lines and circuits running to the U.S.

Sweden also recently eliminated restrictions on international resale as part of a major reform that allowed a new carrier, Tele II, AB, to compete with the dominant Swedish carrier Televerket, AB, according to Keith Bernard,

(continued on page 28)

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—Al Prekeris,
V.P., Engineering
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WorldCom

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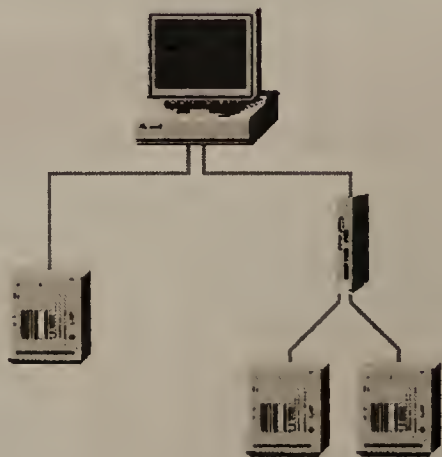
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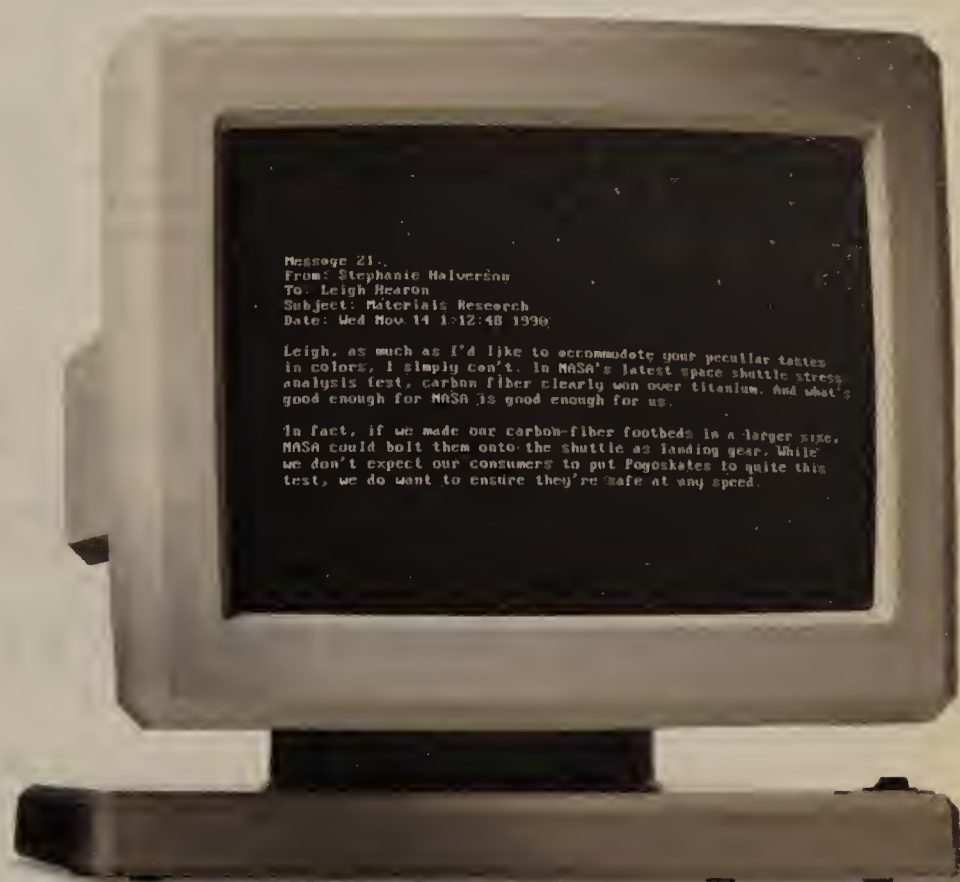
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Easing of resale bans may alter int'l nets

continued from page 23

vice-president for international and regulatory affairs at Cable & Wireless North America, Inc., a unit of the global network giant Cable & Wireless PLC in London. Cable & Wireless PLC owns 40% of Tele II.

The U.K. has proposed ending restrictions on international simple resale as part of a major regulatory restructuring now under way. In addition, Australia has proposed legalization of international resale as part of a major telecommunications reform package expected to be adopted July 1. Pressure for similar reforms is building in the European Community, Hong Kong

and Japan (see graphic, page 23). The U.S. has no restrictions on international resale.

Regulators are moving to allow resale in order to reduce international calling charges, which most observers say far exceed provisioning costs. The Federal Communications Commission, along with other regulatory agencies worldwide, argues that resale could slash international calling rates by enabling start-up firms and carriers to leverage economies of scale from international private lines to undercut existing prices.

A recent analysis of the international resale market by *Network World* and Washington, D.C. consultancy Communications Network Architects, Inc. found that resellers offering switched service via T-1

lines between London and New York could charge less than half the current rates for international switched services and break even ("U.K. embraces plan for full competition in net arena," *NW*, March 11).

Better service

International resale could offer more than reduced prices. Existing carriers say legalization of resale would enable them to compete more fully in foreign markets.

For example, carriers are currently restricted to providing only the portion of an international private line that originates in their country. But if resale were legalized, international carriers could lease broadband circuits from foreign carriers and sublease end-to-end private lines to users.

This would be the ultimate one-stop shopping arrangement because users would no longer have to contract with a foreign carrier to obtain the foreign end of a private line. WorldCom's Frylinck said his firm plans to offer this kind of international resale service between London and New York as soon as the U.K. allows it.

He added that WorldCom would also like to use resale to provide international switched services. Resale would enable WorldCom to undercut existing switched service prices and also offer switched services to users in the U.K. for the first time.

Bernard said Cable & Wireless' official corporate policy is to establish resale operations in countries where permitted.

"As part of our strategy of being a global competitor, we want to compete in every market we're allowed to enter," Bernard said. "Our preferred approach is to set up a facilities-based carrier; but where this isn't allowed, we will consider resale."

Cable & Wireless maintains a resale operation in Canada, in addition to its facilities-based carriers in the Caribbean, Hong Kong, Sweden, the U.K. and the U.S.

While regulators around the world are expressing support for an end to resale restrictions, Charlie Meyers, manager of international policy development at AT&T in Morristown, N.J., doubts that the changes will occur overnight. "I think they're going to move slowly," he said. **■**

The First 150 Fax Get The Facts on Global Type Approval

All countries have rules and procedures associated with attaching telecommunications equipment to networks. However, countries differ on which of a variety of technical standards should apply to those devices that will be integrated into a network.

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The Global Telecommunications Equipment Approval seminar will educate manufacturers of telecommunications equipment on how best to approach their global type approval requirements. Topics covered will include:

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- How countries approach equipment certification.
- Overview of testing options.
- Country approaches.
- Regional approaches.
- Do's and don'ts of global certification projects.

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The seminar will be held on Monday July 15 and half a day on Tuesday, July 16 during ComNet West. The cost will be \$695.

To tentatively confirm one of the 150 course openings please fill out the form below and fax to Nanci Farquharson at 508-879-3167 or call 508-820-7402 or mail to:

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AT&T to reduce toll-free service costs

continued from page 23

from 2% to 27% on its 800 Masterline Service.

Masterline enables users to employ a dedicated voice-grade circuit in order to receive international, interstate and intrastate toll-free calls.

Daytime rate reductions range from 2.3% to 16.9% in the contiguous 48 states for Masterline, while reductions for evening calls run as high as 26.5%. Discounts for Masterline to Hawaii run from 18% to 19.8% during the day and as much as 27% during the evening.

In 1984, the carrier began offering international toll-free calling service from Canada, which is the first country from which AT&T offered international toll-free calling service. Now the carrier offers international toll-free calling services from 56 countries. **■**

Firm to offer resale matching service

continued from page 23

vice, Gentle said, adding that Bandwidth Brokers will address that business need.

While resale was allowed domestically in the U.K. last year, the practice there has languished. According to Gentle, part of the reason is because users with extra capacity may find it difficult to locate customers.

Bandwidth Brokers would make that job easier.

The move by U.K. regulators to allow international resale will greatly expand the market Bandwidth Brokers can serve, he said.

In addition to matching resellers with customers, Gentle said his company will help its customers set up local-loop connections for resale arrangements if customers want that service. **■**

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

NRC revamps Fusion for TCP/IP, Windows 3.0

Network Research Corp. of Oxnard, Calif., last week upgraded its **Fusion for HP BASIC** software, which enables workstations running Release 6.0 of Hewlett-Packard Co.'s Rocky Mountain BASIC to access Transmission Control Protocol/Internet Protocol networks.

The firm also recently added a Microsoft Corp. Windows 3.0 interface to its **Fusion for DOS** software, which links DOS-based microcomputers to TCP/IP nets.

In addition to supporting HP Rocky Mountain BASIC 6.0, Fusion for HP BASIC supports the company's Shared Resource Management for HP/UX, a proprietary protocol that enables workstations running HP BASIC or Pascal to access files and printers on workstations running HP/UX, HP's version of Unix.

Fusion for HP BASIC also enables workstations running HP Rocky Mountain BASIC to use TCP/IP's File Transfer Protocol to exchange files with any other TCP/IP node and Telnet virtual terminal protocol to log on to any other TCP/IP node as a terminal.

Fusion for HP BASIC costs \$995. Packaged with Eventide, Inc.'s WLZ-320 EtherBoard Ethernet adapter, the package is priced at \$1,595.

With the new Windows interface, users with Fusion for DOS can access TCP/IP services such as the File Transfer Protocol and the Telnet virtual terminal protocol by clicking on an icon. Previously, users had to type in commands to access those services.

The new software also enables users to invoke Sun Microsystems Inc.'s Network File System by clicking on an icon representing a file on a remote system. Fusion for DOS will let users have 10 or more windows open at one time, depending upon the microcomputer's processor and memory. Current users of Fusion for DOS will receive the Windows 3.0 interface at no cost. The Windows 3.0 interface will be included with Fusion for DOS, which costs \$295.

Network Research Corp., 2380 N. Rose Ave., Oxnard, Calif. 93030; (805) 485-2700. ☐

SynOptics unveils NCE mgmt. tools

By Eric Smalley
Senior Editor

SANTA CLARA, Calif. — SynOptics Communications, Inc. last week announced two network management applications for its recently introduced Network Control Engine (NCE).

The NCE is a Sun Microsystems, Inc. scalable processor architecture processor running SynOptics software that can be used on Ethernet, token-ring and Fiber Distributed Data Interface networks to gather network data and forward processed information to a central network management station. The applications are the NetMetrix Protocol Analyzer and NetMetrix Load Monitor. They were written for SynOptics by Matrix Computer Systems, Inc. of Nashua, N.H.

The Protocol Analyzer captures and disassembles data packets, enabling network managers to monitor for error rates, traffic

patterns and protocol efficiency. The initial version will analyze the Address Resolution Protocol, Reverse Address Resolution Protocol, Internet Control Message Protocol, User Datagram Protocol, Transmission Control Protocol/Internet Protocol, Telnet, Network File System, Mount, Portmapper and SunRPC packets.

A later version will support Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet and Novell, Inc.'s Inter-network Packet Exchange (IPX) packets, the company said.

The Load Monitor tracks packet traffic volume, providing statistics on the network load based on source node, destination node, protocol, application and packet size.

The NetMetrix applications are X Window applications and employ a floating license, enabling network managers to access them from any workstation or X Window terminal on the net.

The applications are scheduled to be available next month for \$1,995 each. Three licenses can be purchased for \$3,995.

SynOptics is located at 4401 Great America Pkwy., P.O. Box 58185, Santa Clara, Calif. 95052; (408) 988-2400. ☐

FaxPump melds fax, call processing capabilities

CAMPBELL, Calif. — FaxPump Systems recently announced FaxPump, a device that combines call processing with facsimile capabilities to enable users to call into and retrieve data from a fax server.

FaxPump comprises a voice processing board and a fax board that fit into two slots on an IBM Personal Computer AT, enabling the computer to answer telephone calls, offer callers a choice of fax documents and transmit the data via fax.

Using digitally recorded messages, FaxPump prompts callers through a series of menus to identify data files that the device can then fax to the caller. The device connects to most private branch exchanges and can be physically attached to a local-area network, the company said.

Accessing the data

Callers may access data stored on the Personal Computer AT's local hard drive or on a server residing on a LAN. Once callers have identified the desired documents, they can input a fax number. FaxPump will then dial the number and transmit the documents.

If the original call is placed

from a fax machine, the caller can press the RECEIVE key and FaxPump will automatically transmit the files at the caller's expense.

Once a user inputs a fax number, FaxPump creates a cover sheet and identifies the recipient by phone extension number for routing in large organizations. FaxPump also enables callers to select multiple documents and queue them up for fax transmission.

Custom menu interface

On-board software provides users with a custom menu interface that enables them to design custom handling routines in order to process incoming calls.

FaxPump is suited for small to midsize companies that cannot afford high-end voice mail products, the company said.

The device requires 640K bytes of system memory, a hard disk drive and runs on personal computers equipped with Microsoft Corp.'s DOS 3.1 or higher.

FaxPump costs \$1,295 and is available now.

For further information, contact FaxPump Systems at 181 N. Central Ave., Campbell, Calif. 95008, or call (408) 370-6375. ☐

Telebit announces asynch net server

New LAN server enables modem bank to be used for inbound as well as outbound transmissions.

By Eric Smalley
Senior Editor

SUNNYVALE, Calif. — Telebit Corp. recently introduced a LAN-based communications server that supports a bank of modems, which can be used for inbound or outbound transmission.

Telebit's Asynchronous Communications Server (ACS) allows remote microcomputer users to connect to local-area networks that support either the Network Basic I/O System or the Inter-network Packet Exchange/Sequenced Packet Exchange (IPX/SPX) protocols.

Ports are allocated for inbound or outbound connections as needed, meaning the modems do not have to be dedicated to receiving inbound connections or making outbound calls.

The ACS, which comprises add-on modules for file servers and Telebit software, can support as many as 32 modems for file servers based on the Industry Standard Architecture (ISA) bus and as many as 48 modems for servers based on the Micro Channel Architecture (MCA) bus.

Each port can support data

transmission speeds up to 57.6K bit/sec. Although the fastest modems currently available operate at 38.4K bit/sec, the ACS supports a higher data transmission speed in anticipation of the next generation of modems, a company spokeswoman said.

The Telebit ACS includes an audit log that records port activity by the user, failed port allocation attempts, packet counts from the server and error statistics for each port. The product also allows any station on the network or connected remotely to act as a console and view the ACS management display.

Telebit's ACS includes licenses for Digital Communications Associates, Inc.'s CrossTalk Mk.4 communications and terminal-emulation software, and Dynamic Microprocessor Associates' pcAnywhere IV/LAN.

The Telebit ACS is available now. The eight-port ISA version is priced at \$3,995, while the 16-port MCA version costs \$5,995.

Telebit can be reached at 1315 Chesapeake Terrace, Sunnyvale, Calif. 94089; (408) 734-4333. ☐

DEC offers service for help desks

MAYNARD, Mass. — Digital Equipment Corp. recently announced a service to assist users in designing, implementing and managing computer and network help desks.

DEC said the service will especially appeal to companies that want to farm out help-desk operations in order to focus network personnel on core business tasks, such as application development.

The vendor's Help Desk Service includes three primary functions: evaluation and design, implementation and operation, and problem resolution coordination and management reporting.

Depending on the customer's needs, DEC will consult on the design and planning of help-desk operations, manage development and implementation of the help-desk installation and provide ongoing management, in-

cluding the handling of problem resolution and reporting for multivendor network setups.

Under the evaluation and design portion of the service, DEC technical consultants will examine a customer's current capabilities and forecasted needs, then use that information to design a help-desk strategy.

As part of the implementation and ongoing help-desk management, DEC can provide call response systems as well as call management, such as logging, tracking and closing of calls to the help desk.

DEC provides two options for problem resolution coordination: a shared help-desk setup, where DEC can manage the call response process and turn over the problem to another vendor's on-site representative, or a fully outsourced contract, where DEC can manage the entire process.

DEC's Help Desk Service is available now. The vendor said pricing is based on individual customer needs.

For more information, contact Caroline Spear at DEC, 40 Old Bolton Road, Stow, Mass. 01775, or call (508) 496-9671. ☐



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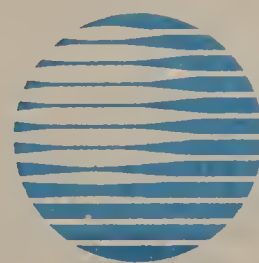
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OPINIONS

DOWNSIZING

BY DAVID CRAWFORD

No such thing as a free network

Today, the notion that the demand for minicomputers and mainframes will dwindle as more computing tasks are shifted to less expensive personal computers and networks is readily accepted. The current buzzword — downsizing — describes this transition.

In the most common downsizing scenario, the network grows slowly and works in parallel with the mainframe while the migration takes place. But instead of acting as a cost saver, the network actually becomes an additional expense. Network analysts then find themselves at odds with MIS managers who believe that expenditures for software and maintenance should be proportional to the physical size of the CPU chassis.

This difference leads to a financial double standard. An MIS manager may be willing to buy a mainframe application for \$50,000 but will balk at spending \$1,000 for network software. The mainframe will be protected at great expense by a hardware service contract, but there won't even be a spare hard disk in stock for the network server. An operations staff will back up the mainframe's data every night, but network

users will be warned to save their own files on floppy disks.

When the budget battle heats up, MIS managers will often refuse to spend any money for network software and maintenance on the grounds that the network isn't doing "real work" yet, thus ensuring that it never will.

It's tempting to blame the failure of downsizing projects on the stinginess of managers, their lack of vision or fear that their hegemony will be diminished as the computer room shrinks from an air-conditioned fortress filled with mainframes to a dusty telephone closet filled with servers and twisted-pair wiring hubs.

Network analysts deserve part of the blame in these situations. They could be at fault for presenting the cost of the net as the price of a server, its operating system, some cabling and a few dozen interface boards. If so, they failed to accurately estimate the true cost of building and running a network.

Network analysts usually rise from the ranks of personal computer hardware experts and tend to view a computer as a CPU in a box. It's common to hear local-area network administrators in mainframe-based organizations boast that their personal computer servers have more MIPS than the water-cooled behemoths in the computer room. They're correct, in theory, but they've missed the point that organizations need systems, not merely CPUs. And systems cost more than CPUs.

Many network analysts need to develop more skill in estimating the overall cost of a downsizing project. If they don't include operating expenses such as backup and hardware maintenance in the original budget, their managers will accuse them of nickel and diming them to death when the need for these items becomes apparent.

The lesson that both analysts and managers need to learn is, paraphrasing Robert Heinlein, "There ain't no such thing as a free network." Network servers may be less expensive than mainframes, but they can't assume the mainframe's role until we take them seriously. That means spending enough money for software and maintenance to make them useful and reliable. ■

Crawford is network coordinator at California State University in Northridge, Calif.

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EDITORIAL

FCC effort to lower rates for calls abroad is laudable goal

In the past, we've criticized the Federal Communications Commission for its handling of some important networking issues.

But we think the members of the FCC, led by Chairman Alfred Sikes, are right on the money in the effort to convince foreign telecommunications providers to lower the accounting rates they charge U.S. carriers to complete calls abroad.

Today, these accounting rates are set well above the actual cost of providing service — as much as 50% above costs by some estimates. The head of the FCC's Common Carrier Bureau said recently that U.S. carriers may be paying between 50 cents and \$1.40 more per minute for calls completed in Europe than the European carriers charge each other.

That overpricing is directly reflected in the cost of international networking and has been

a primary factor in this nation's international telecommunications trade imbalance.

Carrot-and-stick policy

Recently, the FCC proposed a number of steps to encourage foreign carriers to bring accounting rates more in line with service costs. The steps range from carrots — making it easier for providers to voluntarily cut rates — to sticks — potentially mandating a maximum amount that U.S. carriers can pay foreign carriers to complete calls in their countries.

The problem is that the FCC has limited authority in this area. It cannot order foreign telecommunications providers to toe the line, and by flexing what muscle it does have, the agency risks setting off a global political battle.

This is where you, the user, come in.

Today, foreign service pro-

viders are vying for U.S. network business both here and abroad. And while these telecommunications giants may not have to heed the FCC, they must listen to users in order to win business.

Users should express strong support for the FCC proposals not only to the commission but also to the U.S. offices of foreign carriers.

Let these companies know that these out-of-balance accounting rates need to be addressed. The time for such monopolistic or oligopolistic behavior in the network arena is past.

Service prices should be based on the cost of doing business, not the strategy of price-gouging or cross-subsidization.

Let the FCC hear from you, alone or collectively. And while you're at it, press the State Department to speak up on this issue as well. ■

OPINIONS

MANAGEMENT ISSUES

BY NATHAN MULLER

When your company hires a barnstorming executive

The situation is becoming increasingly familiar: A new executive joins the company and wants to make his mark by turning information systems and communications networks upside down. With new technologies installed, new management systems to learn, new people brought in and new vendors with which to deal, the message to staff is clear: "Play my game or you're out."

The corporate barnstormer goes off in all directions at once, leaving subordinates to catch up if they can. One moment the new executive is adamant that 56K bit/sec lines are all the company will ever need. The next moment he wants the same lines to handle compressed voice, 9.6K bit/sec facsimile traffic and token-ring local-area network interconnection as well.

Even vendors can't keep up. The barnstorming executive doesn't care about details. He just wants a multiplexer network for the price of a modem network and can't understand why the multiplexer vendor won't slash another 30% off the already drastically reduced price.

Although a new network may be imminent, the issue of training is almost never broached by the ambitious executive. Making sense out of a new network comes later, preferably much later.

Furthermore, the barnstorming executive figures that the vendor can always be counted upon to provide all the necessary training, which would be free of charge if the vendor wants to continue doing business with the company.

There are plenty of executives who perform well in overseeing their company's information systems and communications networks. Unfortunately, there is a growing number of other executives who are not up

Muller is manager of consultant relations at General DataComm Industries, Inc. in Middlebury, Conn.

to the job, and this can have disastrous consequences.

Rather than throwing up their hands in despair, there are some steps staffers can take to prevent a bad situation from getting worse. As one network manager put it recently, "Three vice-presidents and three networks later, I'm still here."

First, be consistent in your advice. The barnstorming executive is looking for any sign that staff is caving in or waffling on issues. This provides reinforcement that what he is doing is right since staff obviously can't be counted upon to render an informed opinion.

Fortunately, the reign of most barnstorming executives is short.

▲▲▲

Second, address only the facts at hand. Resist the temptation to set the record straight by bringing to light inconsistencies and contradictions in your supervisor's statements and behavior. This is the excuse the barnstorming executive needs to bring in new people who are "team players."

Third, use tact in bringing up new ideas and do not take it personally if you get no immediate reaction. The self-serving executive prides himself on being the sole repository of all good ideas, so this is usually dangerous turf. But if your idea is good, he will let it incubate so that it can be hatched later as his own.

Fourth, do not go over the executive's head to inform top management of impending disaster. Rather than take unnecessary risks, let other department heads do the talking for you.

Start by documenting your

concerns and proposing alternatives to your supervisor so you can send courtesy copies to those with a sympathetic ear. Your objective is merely to float your ideas to the top, not to get a pat on the back.

Fifth, don't get too close to the barnstorming executive by conversing on personal or career matters. This type of executive only has one thing on his mind — personal gain. If there is anything to be gained by using your own words against you, count on it being done, either during an open meeting or privately during a performance review.

Finally, do not go out of your way to inform the executive of your daily activities. Simply adopt the attitude that you are doing the job you were hired to do and that you need neither permission nor special authorization to continue doing it. This will prevent unnecessary criticism and interference, which can quickly become the rule rather than the exception.

The barnstorming executive inflicts damage of a most insidious kind, striking at the heart of an organization's ability to compete and depriving it of the flow of ideas and creativity that is the lifeblood of any enterprise.

Typically, these people are only invited into the organization because they talk a good game and appear enthusiastic about what they can accomplish. It doesn't take long for the veneer to wear thin.

Fortunately, the reign of most barnstorming executives is short. They typically raise the ire of top management or become enamored with opportunities elsewhere.

Either way, staff can still make a notable contribution to the success of their organization by maintaining a professional attitude, keeping an open mind and continuing to do what they do best — running information systems and communications networks for maximum availability. **■**

LIKE ALLIGATORS IN A SWAMP, unforeseen problems can really put the bite on a communications operation. Many managers find themselves wrestling with these networking reptiles every day.

If you've survived an "alligator attack," share it with our readers by calling Susan Collins, assistant features editor, at (508) 820-7413 or fax your idea to us at (508) 820-3467. Alligators should be 1,200 words in length and submitted either on disk or via modem.

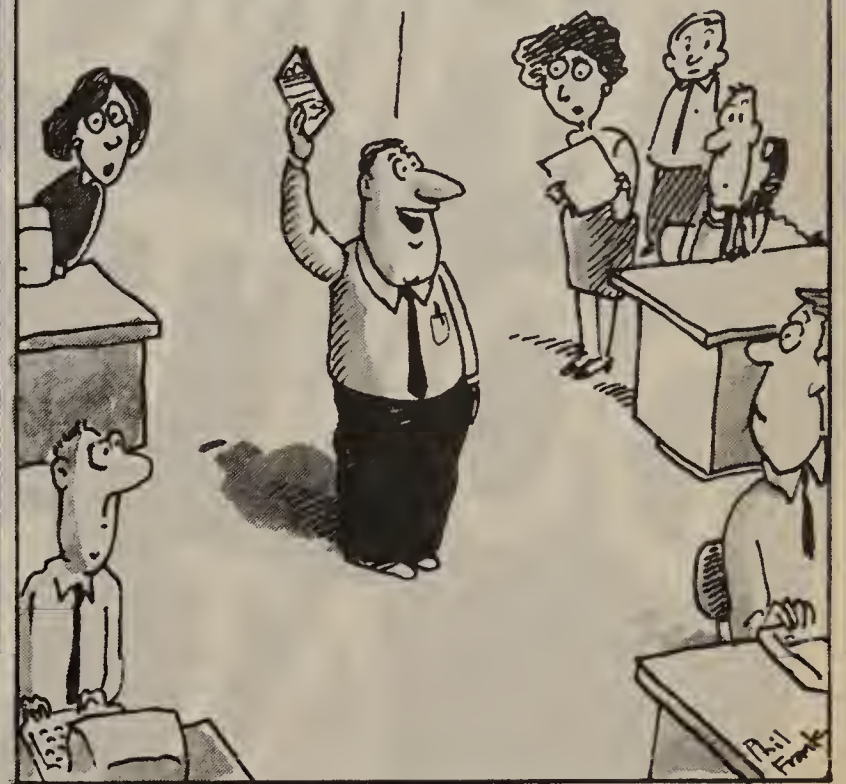
TELETOONS

BY FRANK AND TROISE

The Network Manager's Handbook Rule 43

How to avoid injuries in the workplace:
Step 1: Never do this:

Anyone want this
all-expense paid ticket
to Tahiti-Comm-'91?



LETTERS

Don't blame the tools

I must take issue with your coverage of the recent Infonet electronic mail outages ("Sporadic Infonet E-mail outages pester some users," NW, March 18). I question your editorial judgment in centering the story around "hardware troubles with a Unisys Corp. mainframe and front-end processor."

We at Unisys are proud of the reliability and performance record of our networking products. According to our records, the mainframe and front-end processors used in Infonet's Notice E-mail network were installed in 1978 and, therefore, have been in service for more than 12 years. The last Unisys service contract for this hardware was in 1989. Furthermore, we understand that the Unisys front-end processors now contain memory from an unknown source.

These facts should have been part of the story. As the number of third-party service companies in this high-tech

industry continues to grow, reporters and readers alike should remember the old adage: "A good carpenter doesn't blame his tools; he takes care of them," particularly when they are networking tools that have been reliable for more than a decade.

Brian Pickersgill
Program manager
Unisys communications
networking products
Unisys Corp.
Blue Bell, Pa.


Comments for Compaq

I read with great interest W.D. Riley's recent opinion piece on Compaq Computer Corp.'s SystemPro support strategy ("Compaq needs a (continued on page 53)

Network World welcomes letters from its readers.

Letters should be typed and double-spaced. Mail them to Editor, Network World, 161 Worcester Road, Framingham, Mass. 01701.

Letters may be edited for space and clarity.

A yellow triangle pointing downwards, located at the top center of the dark blue cover.

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The new SNA

By ATUL KAPOOR

Like the phoenix, Greek mythology's immortal bird, IBM's Systems Network Architecture is being consumed and transformed in order to be reborn from its own ashes.

The reborn phoenix in this case is a new SNA enhanced with Advanced Peer-to-Peer Networking (APPN), a new set of protocols designed for the age of distributed processing and local-area networks.

While IBM has offered APPN since 1986 on its System/36 and has included the capability in its more recent Application System/400, the company considered it a feature specific to these machines and not a formal part of SNA.

All that changed this past March, however, when IBM made APPN not only part of SNA, but also part of IBM's Systems Application Architecture (SAA), the master architecture that forms the basis of all future IBM product development.

Also announced in March was the availability of APPN support on the IBM 3174 controller and OS/2 Extended Edition, two platforms that play a major role in IBM's Token-Ring LAN implementations. According to sources within IBM, APPN support on VTAM and IBM's Network Control Program (NCP) should start rolling out in about a year.

This article describes APPN and discusses its implications and advantages. It illustrates how the user can integrate APPN into an existing SNA network, known as subarea SNA. The article also debunks

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the assertion by many SNA experts that APPN cannot accommodate older logical unit types by showing how it can be used with LU 2.

Limitations of 'old' SNA

Some of the major limitations of SNA's existing subarea architecture include:

- **Static routing tables.** All changes in network topology require that new routing tables be loaded in each VTAM and NCP.

- **Manual definition of detailed configuration information.** On an SNA network with hundreds of links, thousands of terminals and numerous subarea nodes, this is quite a chore.

- **Dependent logical units.** If VTAM is not running on the host, logical units in Type 2.0 nodes will depend on the System Services Control Point (SSCP) in VTAM to establish their sessions and, therefore, cannot initiate any new sessions.

- **No direct communications between peripheral logical units.** Logical units in Type 2.0 peripheral nodes can communicate only with host applications and are limited to one session at a time.

While such an architecture might have been sufficient during the 1970s, it is clearly deficient for the age of LANs, personal computers and distributed processing.

Evolution of the new SNA

The 1984 announcement of LU 6.2, also known as Advanced Program-to-Program Communications was one of the first steps in the rebirth of SNA.

APPC for the first time allowed the use of intelligent logical units in peripheral nodes on an SNA network. However, LU
(continued on page 38)

APPN and APPC continue to transform SNA.

(continued from page 37)

6.2 sessions were initially limited by Type 2.0 peripheral nodes, which could only support dependent logical units.

The umbilical cord that tied all sessions with the host was loosened somewhat in 1986 with the announcement of a new peripheral node called the Type 2.1 node.

An LU 6.2 in one Type 2.1 node could set up sessions with an LU 6.2 in another Type 2.1 node without any host involvement. Logical units thus engaged are known as independent logical units. IBM refers to connections between two T2.1 nodes as Low Entry Networking (LEN).

To allow LEN-based APPC sessions using existing subarea networks, IBM introduced LEN support with VTAM Version 3.2 and NCP Versions 4.3 and 5.2 in 1988.

As shown in Figure 1 on page

The umbilical cord that tied all sessions with the host was loosened with the Type 2.1 node.

▲▲▲

40, a logical unit at Node A can set up a session with a logical unit at Node B without being aware of the intervening subarea transport. However, in a traditional subarea SNA network, information about the location of LEN nodes needed by NCP for routing is kept only in VTAM.

Thus, NCP alone cannot facilitate communications between Nodes A and B without first obtaining information about their locations from VTAM. However, once the sessions have been set up, the SNA host no longer needs to be involved, unless a host-based system such as NetView is being used for network management.

The basics of APPN

APPN introduces two types of nodes as extensions of LEN — the network node and the end node. Although these nodes can support all logical unit types for host access, APPN was primarily designed to support peer-to-peer sessions using APPC.

With these additional node types, it also becomes possible to build network directories dynamically and to implement a complete mesh network without involving any subarea nodes or host computers. The end result is a completely distributed SNA network with any-to-any and peer-to-peer connectivity but without

the necessity of manually defining detailed routing tables at each node.

An APPN network node acts as a network server to the adjacent end nodes and LEN end nodes that form its domain. The services provided by an APPN network node server include:

■ **Directory services.** The directory services provided by a network node can eliminate the need to define logical unit loca-

tions manually in an APPN network. A network node maintains a local directory, which contains information about logical units that are in the network node's domain, and a distributed directory, which contains information about logical units that reside in other domains.

End nodes provide directory information to their serving network node when they establish control point sessions with it. Us-

ers must manually define directory information about logical units residing in LEN end nodes.

Network nodes create distributed directories dynamically by using control point sessions to conduct directory searches in co-operation with other network nodes. Using control point sessions, the network node server provides the current location of remote logical units to end nodes in its domain.

■ **Topology and route selection.** The network node selects the best route for network traffic based on a class of service specified by the application program/logical unit when the session is initiated. The class of service includes information about performance characteristics desired for the session.

The old SNA BIND command, which initiates sessions, now

(continued on page 40)

A critical view of APPN

It has been almost five years since IBM first announced Advanced Peer-to-Peer Networking (APPN), its distributed network routing and session control architecture.

APPN allows networked computers to communicate dynamically with each other as equals, without all the predefined centralized control currently required by IBM mainframe Systems Network Architecture nets.

But despite the recent spate of IBM APPN announcements ("IBM extends APPN to OS/2, 3174 devices," *NW*, March 11), is APPN too late to have a strong impact on network users?

While waiting for APPN to unfold, IBM users have begun incorporating non-SNA protocols into their networks. Router vendors such as Cisco Systems, Inc. have been moving quickly to fill the routing gap IBM has left in the peer networking arena. Thus, rather than driving the router market, APPN may have only a small niche.

Here are some of the potential obstacles to widespread user adoption of APPN:

■ **Multiple protocols.** Many traditional IBM customers are no longer using SNA exclusively throughout their operations. Currently, the Transmission Control Protocol/Internet Protocol has gained ground in IBM mainframe applications, and Open Systems Interconnect is not far behind.

While IBM has indicated that it plans to address the multiple protocol issue in the near future, APPN is currently an SNA-only implementation.

In other words, APPN end nodes can communicate only with other SNA APPN end nodes or network nodes, and APPN network nodes can route only SNA APPN messages. Therefore, IBM users looking to implement other networking protocols may have to build multiple nets or seek other solutions.

Meanwhile, several router vendors have already announced products that will sup-

port multiple protocols and are considering implementing support for SNA.

■ **Network throughput.** Increases in network throughput have been made possible largely because of improvements in private data line reliability. And as the number of line problems decreases, error recovery in intermediate routing nodes becomes less of a necessity. Routers can achieve higher throughput rates by pushing error recovery out to the end points. When these routers detect an errored frame, it is discarded and the originator must retransmit the message.

APPN, on the other hand, continues to implement error recovery at every APPN node. It also requires an acknowledgment from each intermediate node on all route segments. The benefit is that an errored frame does not have to be retransmitted from the end point.

The downside is that the acknowledgments, retransmissions and resequencing increase overhead, which in turn may decrease overall network throughput. Sources at IBM have indicated that the company intends to remove error recovery from intermediate nodes to improve performance in a future APPN network node release.

■ **Routing costs.** Two APPN end nodes — for example, two user computers on opposite sides of a wide-area network — can be connected just as easily through a router as through an APPN network node.

The cost of running APPN on a Personal System/2-based processor is comparable to the cost of using a router. However, for routing data between the mainframe and other network devices — such as additional mainframes, cluster controllers and personal computers — APPN requires expensive net switches. These are usually either mainframes or, more commonly, front-end processors running IBM's Network Control Program (NCP). While stand-alone routers typically cost between \$20,000 and \$40,000, an IBM 3745 front-end processor ranges in price from \$35,000 to \$500,000.

IBM may be counting on the

value it can add to its APPN network node in order to keep the product competitive with the more affordable routers. Key features available with the OS/2 and 3174 APPN implementations will include dynamic topology updates, flow control, integrated network management, integration into the mainframe SNA networks and distributed directory services.

Before committing to APPN, users seem to be waiting to see how and when these features roll out. Meanwhile, some of these features can already be found in router products, and others may be too far off to be competitive.

■ **Dynamic topology update.** Some IBM mainframe users have eagerly awaited APPN because it will provide them with a method to dynamically establish and define data routes. As IBM users begin to require any-to-any connectivity, routing tables can take on nightmarish proportions.

For example, providing any-to-any connectivity in a network with 50 subarea (VTAM or NCP) nodes can require 5,000 routes and about 20,000 route segments. And each time a new subarea node is added, new routes must be added to all current subarea nodes. To do this, the entire network must be taken down.

However, some currently available routers also perform dynamic topology updates. IBM customers can use these routers to handle complex topology updating, rather than waiting for APPN to become available for IBM mainframes.

■ **Directory services.** The APPN directory is designed to support LU 6.2 only; it can't be used by other IBM-supported protocols, such as IBM's Network Basic I/O System and TCP/IP. The directory also can't be used to locate 3270 host-based applications or to translate a user name into an address. In addition, current APPN directories can't interface with other directory formats, such as X.500 or an electronic mail directory.

For example, to establish an APPN session, a user application must first go to a user directory to obtain a logical unit name, then go to the APPN directory to

get an SNA address. To provide end-to-end continuity, the APPN directory must interface with other directories.

■ **Integration into mainframe SNA network.** IBM is slowly adding APPN to its VTAM and NCP environments. Current VTAM 3.3 and NCP 5.3 software releases allow SNA mainframe nodes to communicate as peers. With VTAM 3.4 and NCP 5.4, scheduled to be released in the third quarter, Low Entry Networking (LEN) nodes will be able to have multiple VTAM and NCP connections and logical units will be dynamically defined. However, other key APPN improvements are not available.

APPN directory services must still be announced for IBM's VTAM and NCP product lines. Currently, APPN end nodes must access mainframe applications as LEN nodes. This is limiting because a LEN node can communicate only with a peer that is logically adjacent and has statically defined partner definitions. But an APPN end node can communicate with its peers directly or indirectly through APPN network nodes and can locate partners dynamically using the directory.

In addition, a large base of 3270 applications that cannot benefit from APPN still exists: 3270 sessions use the LU 2 protocol, which differs from the LU 6.2 protocol APPN requires. LU 2 sessions require VTAM services for initiation, whereas LU 6.2 sessions can be initiated independent of VTAM.

While there are some LU 6.2 applications currently available, the complexity of the protocol and the relatively high storage requirements that it places on personal computers has made migration to this advanced SNA protocol slow.

In the mainframe environment, it may take years for APPN to acquire features such as multiple protocol support, interfaces to other directories, and dynamic topology updates and directory services. Relief for 3270 applications will probably not come until even later. In the interim, many users may find routers to be an attractive alternative.

— Steve Simon

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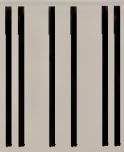
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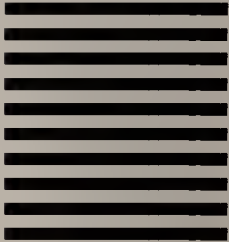
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(continued from page 38) contains a new field that includes information about the selected route.

■ **Network management services.** The network node pro-

control point sessions. Because such sessions use LU 6.2 protocols, which support only half-duplex sessions, all control point sessions must be established in pairs to allow full-duplex commu-

net nodes terminate all sessions using that route.

According to sources within IBM, the company is considering including in APPN the subarea SNA concept of persistent sessions — sessions that can continue across route failures.

APPN network management

APPN provides a network management focal point that can act as a centralized management node on an APPN network. The network management architecture in SNA benefits from APPN since APPN uses LU 6.2 sessions for management data flows instead of the primitive SSCP-physical unit sessions used in the subarea architecture.

IBM's SystemView/400, available on the AS/400 since last month, can be used for centralized management of APPN networks.

Because IBM's NetView currently does not support the APPN management data flows, it cannot directly participate in APPN. Users that want to implement NetView have two options. APPN nodes can either be configured to act as Type 2.0 nodes simultaneously for the purpose of send-

providing subarea connectivity and can start planning full-function APPN networks without any hosts or NCPs.

However, users with existing SNA networks must utilize LEN support in VTAM and NCP to build integrated subarea/APPN networks.

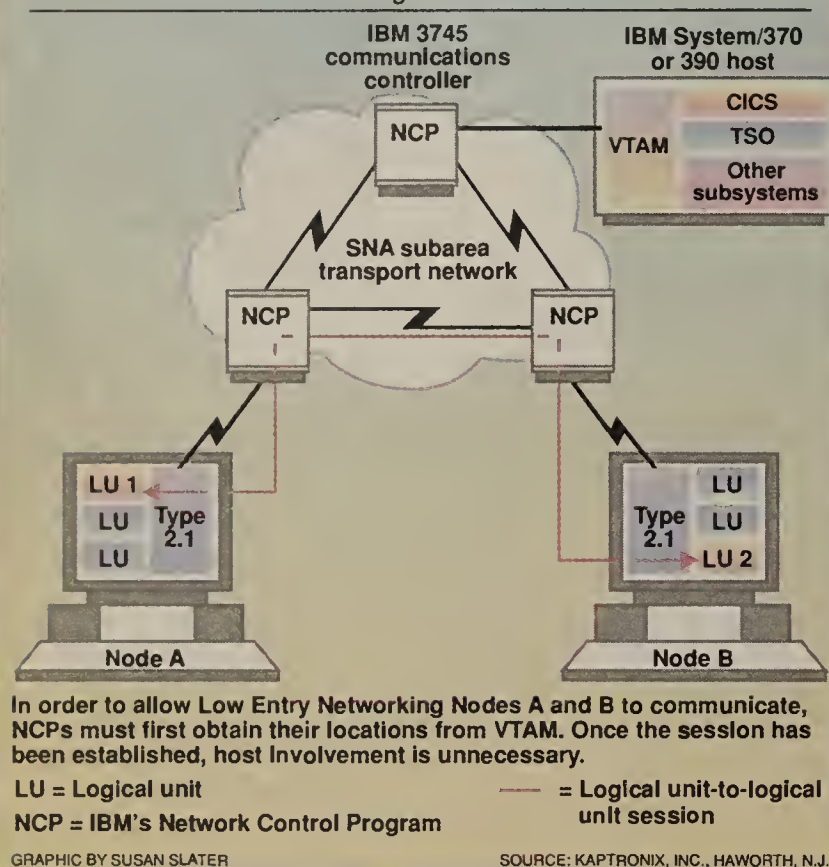
all logical units in Network 1 and Network 2 be manually defined in VTAM. Also, all resources in Network 2 appear to Network Node 2 as if residing in NCP. Since NCP emulates a LEN end node, all locations in Network 2 must be manually defined at Network Node 2 as if residing at NCP.

SNA users interested in migrating to APPN have several options from which to choose.

▲▲▲

LEN support in an SNA subarea network

Figure 1



vides management services in its domain by acting as a relay or focal point for network alarms and other management data.

■ **Adaptive pacing and transmission priority.** This service enables the APPN network to control throughput and to allow transmission of certain data to take priority over other data.

■ **Intermediate session routing.** This function allows session data to span multiple network nodes between session end points. A topology data base in each network node contains information about all network nodes and the links connecting them.

Network nodes keep the data base current by broadcasting topology data base update messages to other network nodes to report topology changes. IBM does not currently publish protocols associated with communications between network nodes.

Two types of network-accessible units (NAU) reside in an APPN node, regardless of whether it's a network, end or LEN end node. They are:

■ **Logical units.** These are LU 6.2 as defined currently in SNA and provide services to transaction programs residing in the logical unit. A node may contain multiple logical units.

■ **Control points.** This new NAU type includes functions of what was previously known as a physical unit in the old SNA. Each node contains only one control point, which is responsible for managing resources in the Type 2.1 node.

Control points in adjacent nodes exchange network information over control point-to-

nications.

Using control point sessions, APPN end nodes can dynamically build local directories and obtain the best route information from the network node server. They also register information about their own logical units dynamically with the network node.

LEN end nodes do not support control point sessions and cannot obtain services from the network node. The local directory for LEN end nodes must be defined manually.

APPN connectivity

APPN products currently support synchronous data link control, X.25, asynchronous, IBM 3270 coaxial and token-ring LAN connections. However, the architecture does not prohibit other types of connections, such as Ethernet or emerging technologies such as frame relay and Fiber Distributed Data Interface.

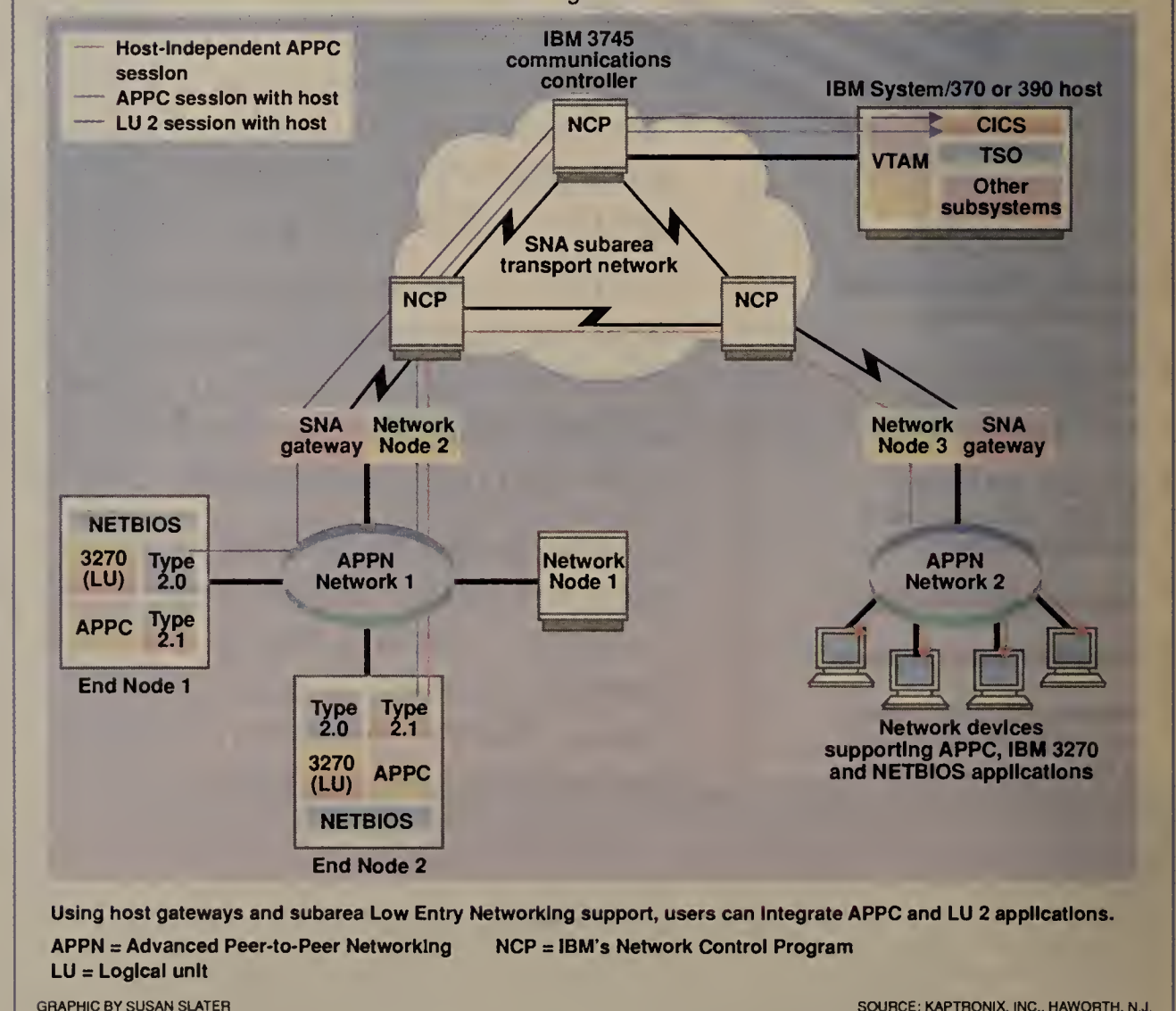
The number of physical circuits allowed between a LEN end node and other nodes are implementation-defined. An end node may have multiple connections with other end nodes and network nodes but can have only one active control point session with a network node at a time.

Links connecting network nodes are called transmission groups and contain only one physical link. However, two network nodes may have multiple transmission groups between them.

A session route consists of nodes containing the session partners as well as all the network nodes and transmission groups in between. When a route fails within an APPN network,

Mixed LU types and subarea connectivity

Figure 2



ing alarms to NetView, or the APPN focal point node can act as a management gateway to NetView.

Implementing the new SNA

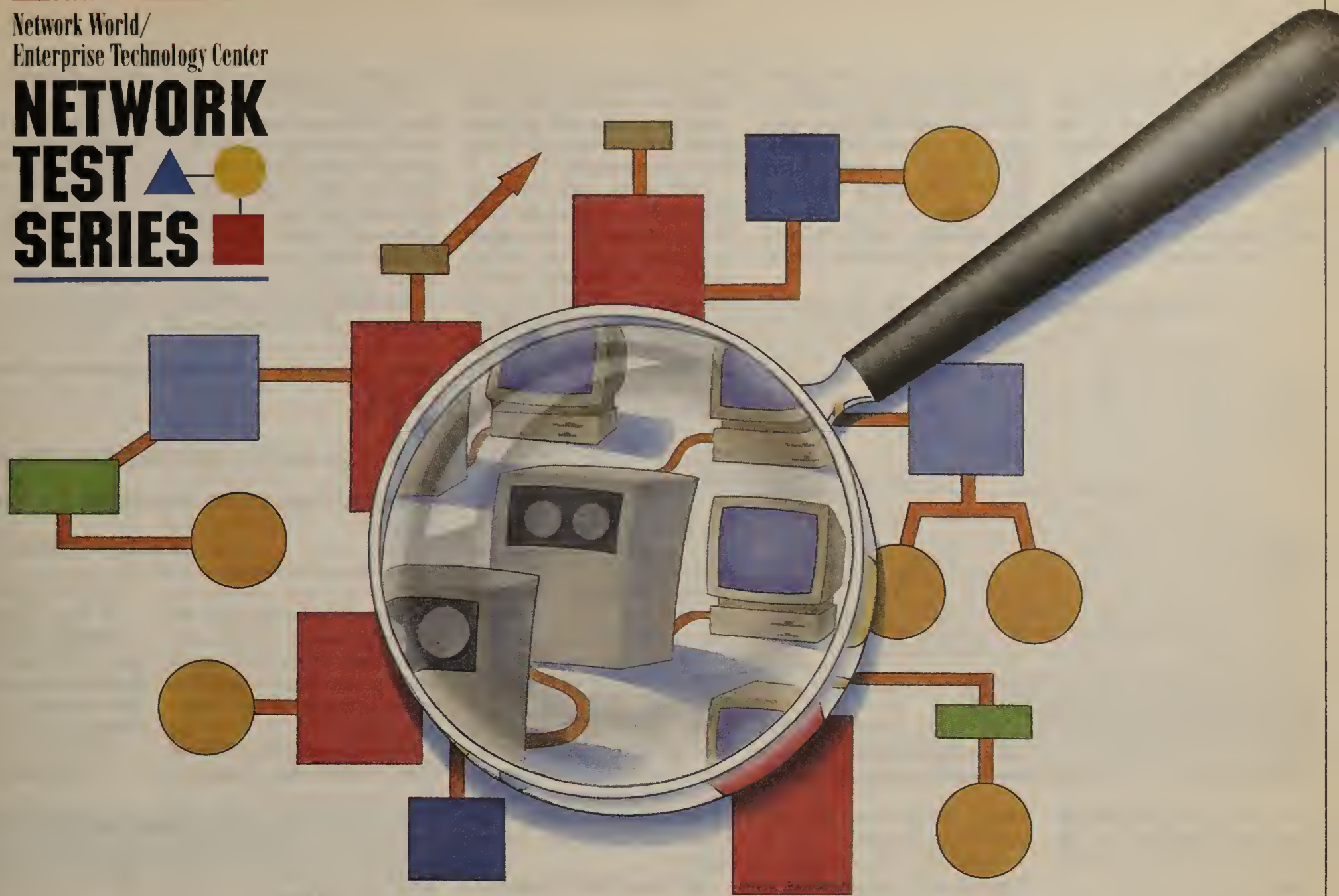
SNA users interested in migrating to APPN have several options from which to choose. Users whose networks consist entirely of AS/400s, personal computers or 3174s need not worry about

ring-to-SNA host gateway. By using VTAM/NCP support for LEN and with the subarea network configured as a backbone, users can support APPC sessions between logical units residing in Network 1, Network 2 and the host.

While this configuration provides complete LU 6.2 connectivity between APPN and logical units in the host, it requires that

feature cannot use other network node services and may access only host applications. According to sources within IBM, there is an outstanding requirement to provide better integration of non-APPC logical units in APPC.

In the subarea network, the non-APPC logical units will be defined as they normally are for a given gateway type. This configuration (continued on page 51)



Router stress tests divide field

CONTINUED FROM PAGE 1

cles in the ongoing test series will provide thorough and objective information to help users make informed buying decisions.

For this article, *Network World*, in conjunction with the Enterprise Technology Center, Inc. (ETC) of Houston, rigorously tested routers in environments designed to closely reflect real-world conditions. From the results, users will easily see which router performed best overall and which performed best in conditions similar to their own

Salamone is Network World's features writer.

network requirements.

Of the many routers currently available, only four were selected for this test: Cisco Systems, Inc.'s CGS; Wellfleet Communications, Inc.'s LN; 3Com Corp.'s NET-Builder; and Proteon, Inc.'s P4100+. These four were chosen because all are multiprotocol

routers with both local and remote routing capabilities, which seem likely to be the most important type of router for the immediate future. In addition, all were designed to work with Ethernet local-area networks, the most common type of LAN. (A similar test of token-ring routers will be

conducted at a future date.)

Four other vendors — Advanced Computer Communications, Digital Equipment Corp., Interlink Computer Sciences, Inc. and Network Systems Corp. — either did not have products to offer or chose not to participate in this test (see "Routers not included in the test," page 43).

An innovative test procedure was created to stress these routers in both a local and remote mode of operation. In the test, the routers, all of which supported both the Internet Protocol and Novell, Inc.'s Internetwork Packet Exchange (IPX) protocol, were

(continued on page 42)

New test series puts
local and remote routers
through their paces.

(continued from page 41)
required to receive and send packets in two directions — exactly what routers have to do in the real world.

The best performer in the group — showing the highest performance in the most categories — was Cisco's CGS router. In

use more than one protocol to carry data. It is fairly common to have a LAN consisting of workstations and a server that generate IPX data packets, connected to a Transmission Control Protocol/IP network.

In addition, many nets use a variety of applications and work-

reactions. That puts an additional strain on a router because the central processing unit will have to split its processing task among the two data streams.

Additionally, this study explored router performance in local and remote tests, as opposed to previous tests that covered only local performance aspects of routers.

"We wanted to find out whether the factors we studied in the local routing tests would still have an impact on router performance or if they'd be masked by the lack of speed of the remote link," says Michael Moyer, ETC Network Test Series Manager.

Test methodology

The approach taken in this study was to first identify a set of factors that most often vary from user network to user network, then to construct tests and vary each factor separately, observing that item's impact on router performance.

The staff at ETC identified three variables — packet size, interframe gap (IFG) and the mix of protocols routed — that they felt would have an impact on the ability of a router to forward packets.

The issues that influence router performance regarding packet size are: how long it takes for a router to receive a packet, how much buffer space is taken up by larger packets and how long it takes to forward the packet onto the intended network.

Moyer notes there is a side issue of whether a router can begin to process a packet before it's completely received or whether it has to complete reception before processing. For these tests, packet sizes of 64, 594 and 1,518 bytes were used.

The second parameter that influences router performance is the IFG, which refers to the time interval between the last bit of one packet and the first bit of the

that media and packet size.

For the local routing test the larger IFG figure was 32.6, 178 and 420 microsec for packet sizes of 64, 594 and 1,518 bytes, respectively. For remote router tests, the figure was 12, 112 and 288 msec for packet sizes of 64, 594 and 1,518 bytes, respectively.

The third parameter that influences router performance is

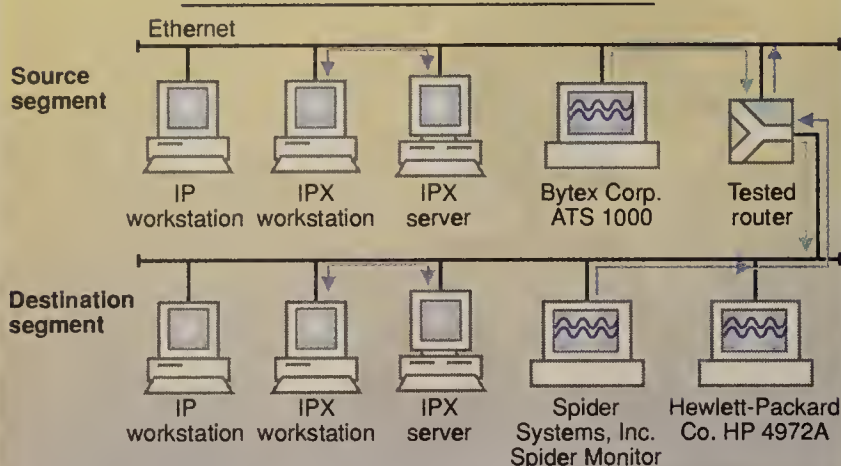
array of measurement equipment.

The testbed (shown in Figure 1, this page) consisted of two 10Base2 (thin-wire Ethernet) LAN segments connected by the router being tested. One segment — the source segment — had a Bytex Corp. ATS 1000 protocol analyzer; this generated the stream of data used in this study.

Packets generated by the ATS

Router test configuration

Figure 1



The configuration was designed to test how well different vendors' routers would work in both local and remote operation modes. Router performance was determined through tests that varied packet size, interframe gap and protocols.

IPX = Internetwork Packet Exchange

GRAPHIC BY SUSAN SLATER

SOURCE: ENTERPRISE TECHNOLOGY CENTER, INC., HOUSTON

most tests, the CGS had both the highest raw throughput and the lowest percentage of packets dropped.

Coming in a close second was Wellfleet's LN router.

Third place overall went to 3Com's NETBuilder router. And trailing the pack was Proteon's P4100+ router, which did excel in the remote routing tests, however.

Although the first three routers had similar performance levels, the Proteon router was not designed to handle the high volume of network traffic generated in this test. A detailed examination of the P4100+ is presented separately (see "Reevaluating Proteon's router," page 52).

These ratings, unlike the listings that summarize other router performance tests, were based not merely on raw throughput but on a ranking of relative performance determined by the ratio of packets dropped to packets offered to the router.

This ratio approach offers a better indication of total network performance than raw throughput figures. A high ratio of dropped packets to offered packets would indicate potentially serious problems with the product. It also means that more data packets must be retransmitted, which increases traffic on that particular segment of the network.

Test philosophy

Benchmark tests try to simulate a variety of real-world situations, so a router test must include a mix of network traffic conditions since different applications generate different network traffic and place different demands on routers.

For example, many networks

stations that generate different types of data streams.

For example, imaging applications will send long streams of large packets across the net. Conversely, transaction processing applications using diskless workstations can produce short, bursty data streams of network traffic.

Unlike other published router performance tests, this study duplicates the real-world conditions of simultaneous transmission of multiple protocols and bidirectional network traffic flow through the router.

Other tests have used multiple protocol routers but have run only one protocol through the tested router at a time. This study used a mix of IP and IPX packets and transmitted them simultaneously. This approach simulates

The best performer in the group was
Cisco's CGS router.



a real-world environment. If a network used only one protocol, it would, in some cases, be more economical to use a bridge rather than a router.

This study also tested the routers under the real-world conditions of handling network traffic in both directions.

Previously published router tests have sent data across a router in one direction. Such tests will yield overly optimistic router performance measurements.

In actual use, routers must handle traffic flowing in both di-

succeeding packet. As the IFG shrinks, packets are presented to the router faster and faster. This leaves less time to process a packet and less time to empty the router's buffer.

The IEEE 802.3 standard defines a minimum IFG of 9.6 microsec. Each test performed in this study used two IFG settings: the minimum 9.6 microsec and one representing 75% of the link maximum — that is, the number of packets per second that equaled 75% of the theoretical maximum packets per second for

To provide a comparison, the protocols selected had to be the same for each router.



the network protocols that the router processes. Specifically, does it take longer to process a mix of protocols or is one protocol easier to process than another?

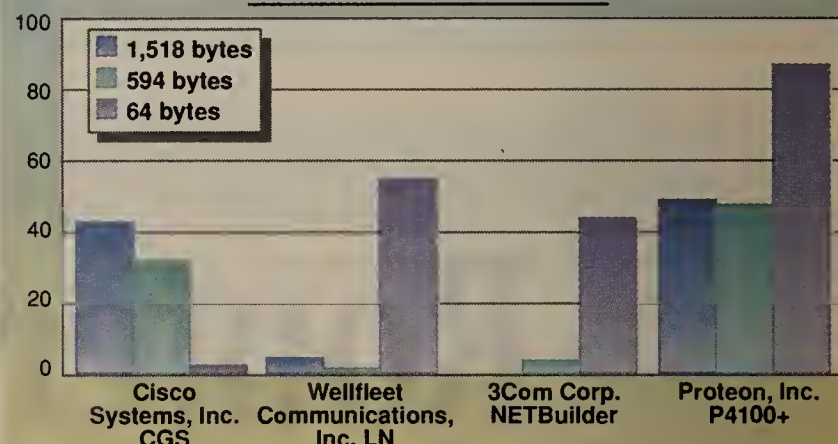
This test was developed to explore whether the processing

1000 were forwarded through the router to the second LAN segment — the destination segment. Packets were captured by a Hewlett-Packard Co. HP 4972A protocol analyzer.

This device was used to measure the packets per second for-

High-stress testing

Figure 2



▲ Percentage of packets dropped

The percentage of IP packets dropped using the IEEE minimum interframe gap (9.6 microsec) between consecutive packets represents router performance under the highest stress levels of this test.

GRAPHIC BY SUSAN SLATER

SOURCE: ENTERPRISE TECHNOLOGY CENTER, INC., HOUSTON

time varied among protocols or whether processing two different protocols increases the router central processing unit's overhead and, therefore, the time required to process a packet.

To provide a comparison, the protocols selected had to be the same for each router tested. Because the four routers all supported IP and IPX, these protocols were chosen.

The performance measurements in all tests were the number of packets forwarded per second and the number of packets dropped.

Dropped packets occur when a router cannot keep up with the network traffic and, thus, cannot process the packets. This study compares the percentage of packets dropped to those offered under various conditions.

The testbed

The testbed for this study included a broad range of equipment that allowed the generation of a mixture of network traffic. In addition, the testbed included an

warded and the number of dropped packets.

A Spider Systems, Inc. Spider Monitor was used to send data from the destination segment to the source segment through the router. The purpose of this traffic was to better simulate the bidirectional traffic flow a router would encounter in normal operations.

Both segments had a TCP/IP workstation, a NetWare IPX file server and a NetWare workstation. The IPX workstation/server pair on each segment generated background traffic on that segment. This traffic was not sent through the router but was included to simulate a LAN environment.

The TCP/IP workstations generated "keep-alive" traffic, which lets the router know that the segment is still active when no data is being sent through the router.

The test methodology was straightforward. The Bytex ATS 1000 created test packets in three sizes: 64, 594 and 1,518 bytes. These sizes were chosen

because they were considered representative of the data on typical networks.

"On many networks, the preponderance of packets falls close to either 64 bytes or 1,518 bytes in size," says Paul LaMar, a staff consultant at ETC. The smaller size packets are generally responses, acknowledgments or other administrative packets; the larger size are representative of traffic generated when files are transferred. The 594-byte packet was chosen as a middle ground.

Each router was tested in a lo-

quence was repeated — first using a different protocol, then a combination of both protocols.

In the test of the remote routing features of the units, the LAN segments of the testbed remained the same but the procedure was modified. To avoid the potential bottleneck of the slow serial link, the speed of the Spider Monitor was reduced, the noise packets were deleted, and the IFGs were set substantially wider. In addition, the two LAN segments were connected by a 56K bit/sec link and a modem eliminator.

Examining the results

All of the tests carried out in this study clearly indicated that router performance could not be distilled to a single number, Moyer points out. In contrast, the tests demonstrated that each of the factors studied may affect router performance, depending on packet size, IFG or network protocol used.

For example, packets per second forwarded is a sound measurement of router speed. But this figure ranged from 463 to over 13,000 for one router, depending on the packet size sent through the router. And the impact of changing packet size varied substantially from vendor to vendor. For the first group of tests performed, only IP packets were used. However, three packet sizes and two IFGs were used.

In throughput tests of each router, IP packets of 64, 594 and 1,518 bytes were generated and sent to the routers. Each test ran approximately 30 seconds and presented a total of 386,400, 45,150 and 19,950 packets, respectively, to the router. The large IFG was used in these tests, translating to an IFG of 32, 178 and 420 microseconds, respec-

■ In both the large and small IFG tests, Wellfleet's LN router forwarded large and midsize packets faster than the other routers but slowed substantially in the 64-byte packet size test.

During the 64-byte tests, the Wellfleet LN started to drop packets. And the percentage of pack-

difference in its ability to route any of the protocols. The router ran 5% to 10% slower on IPX packets than IP packets, although only 2% slower for mixed-packet types. The Wellfleet router had virtually no difference in the way it handled either packet type at 594 bytes. However, at 64 bytes,

noticeably better at 64 bytes than did the Cisco router (see Figure 4, this page) — the opposite of the results produced in the local routing tests.

ETC's LaMar notes that the routers were used "out-of-box" with no additional modification. Some routers will perform better when they are remotely connected to another product from the same vendor.

"Perhaps the Cisco router's default [setting] was to assume the remote router was not a Cisco, and the other vendor's products in this test did recognize that they were linked to similar products," LaMar says.

One further distinction between the local and remote routing tests was that the protocol-dependent variations disappeared. While there were slight differences between routers, each router handled IP, IPX and the mixed traffic at the same rate.

Excluding these cases, the results of the remote tests followed the results of the local routing test when IFG and packet size were varied. The overriding constraint in the remote tests was the bottleneck caused by the link speed and not by the router's ability to process and forward pack-

(continued on page 52)

Some routers will perform better when they are remotely connected to another product from the same vendor.

▲▲▲

cal and remote mode. Each local routing test consisted of the transmission of test and noise packets, repeated as many times as necessary so the test would last at least 30 seconds. The number of repetitions differed because the time to send one set of test and noise packets varied from test to test, depending on the size of the test packet and the IFG.

The HP 4972A was used to count the test packets sent to the destination LAN segment through the router. The number of test packets the router dropped

ets dropped was dependent on the IFG. At the large gap setting, about 30% of the packets were dropped. When the small interframe gap test was performed using 64-byte packets, this number increased by 86%, to a point where over half of all packets presented to the router were dropped.

■ The Cisco CGS sailed through the IP test, finally overtaking the Wellfleet product at the 64-byte packet level. "The Cisco results at 64-byte packet sizes had such a wide variance, we believe that it was performing at a level beyond the capabilities of the test equipment as it was set up for this test," Moyer says. "The equipment could probably make these measurements if used in a different manner — one especially designed for making this kind of measurement."

■ The 3Com NETBuilder router came in third to the Cisco and Wellfleet routers in virtually every test. And similar to the Wellfleet LN, the percentage of packets the NETBuilder dropped in the 64-byte packet tests was 30% for the large IFG and increased to over 40% in tests using the small IFG.

Since many networks carry a mix of network protocols, we compared router performance when first IP, then IPX, and finally a mix of both packets were sent to the router.

In this series of tests, two packet sizes (64 and 594 bytes) and two IFGs (the same as in the IP tests) were used. Each parameter was varied while the others remained fixed and either IP, IPX or both protocol packets were sent through the router (see Figure 3, this page). All told, each router was run through 24 tests. (Each test was run five times, and the results were averaged).

The Cisco CGS showed some

the difference was more pronounced — the router was 10% slower for IPX packets and 4% slower than IP for the mixed packets.

For the 594-byte packets, the 3Com router handled the IPX packets more efficiently than it did the IP packets. In the tests using the large interframe gap, the 3Com router passed packets about 15% faster when IPX packets were sent compared to the test using only IP packets. When the mix of packets was sent to the router, the 3Com unit passed packets at a higher rate than when only IP packets were used.

The 3Com router's performance in handling protocols changed when 64-byte packets were used. In tests using both a small and large IFG, the router processed fewer IPX packets per second than IP packets. For the large IFG tests, a throughput drop of about 35% occurred when switching from IP to IPX packets, yet the mixed data stream passed through at virtually the same rate as the IP packets alone.

Remote routing results

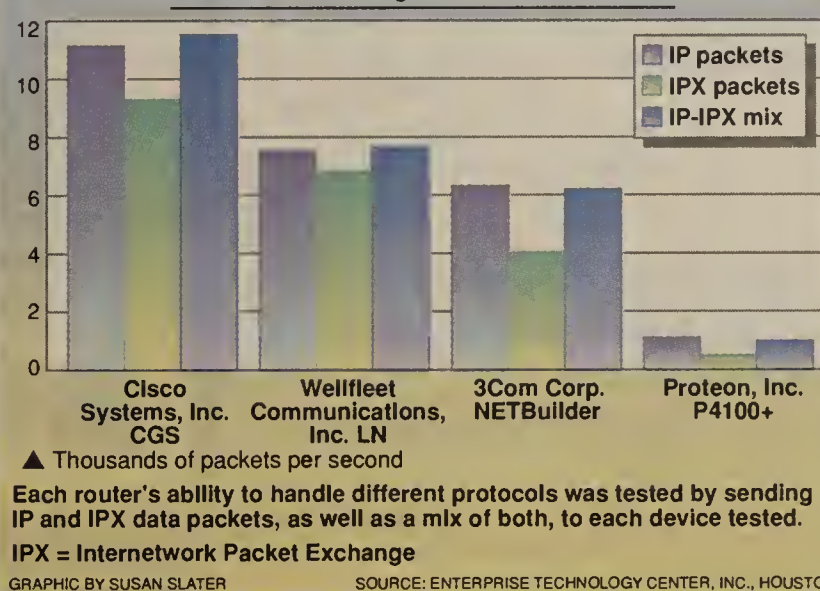
The results of the remote routing tests were different from those of local routing. Most of the traffic presented to the routers was dropped, which was not surprising, according to Moyer. The reason: Packets were sent at very high bit rates, but the serial link could pass only 56K bit/sec.

Since the raw throughput of each router would be limited by the link's inability to pass more packets, this test examined the relative performance differences between the routers.

The Wellfleet and Cisco routers had similar performance levels, yet one difference emerged: The Wellfleet device performed

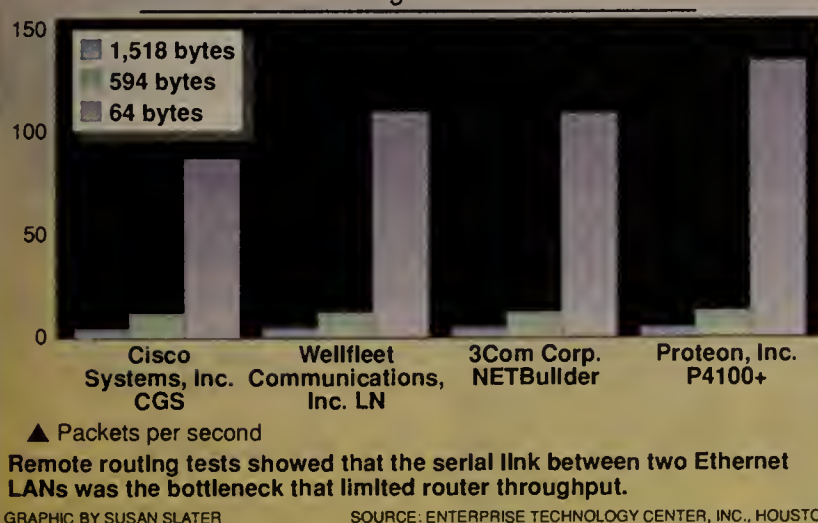
Routing different protocols

Figure 3



Remote routing comparisons

Figure 4



was determined by subtracting the total number of packets received by the monitor on the destination segment from the total test packets sent by the ATS 1000. The percentage of noise packets dropped was considered to be equal to the percentage of test packets dropped.

Each test was run five times for each of the packet sizes. Next, the tests were repeated with the IFG changed. Then the entire se-

tively, for packet sizes of 64, 594 and 1,518 bytes.

Varying the IFG produced different results. The highest stress placed on the routers was in the tests where the IFG is set to the IEEE 802.3 minimum of 9.6 microseconds (see Figure 2, page 42). Here the total number of packets sent was 420,000, 60,900 and 23,100, respectively.

This particular test yielded the following results:

Routers not included in the test

In preparing for this test, the Houston-based Enterprise Technology Center, Inc. (ETC) contacted every vendor that, according to ETC's research, had a commercially available router that performed in both local and remote modes and that supported both the Internet Protocol and Novell, Inc.'s Internetwork Packet Exchange (IPX) protocols.

Some vendors declined to participate in the tests because their products either did not meet the test criteria or would not be available when the tests began. These vendors include: ■ Advanced Computer Communications and Network Systems Corp.: Both said they were in early testing of new product lines and preferred to wait until the new products were in production.

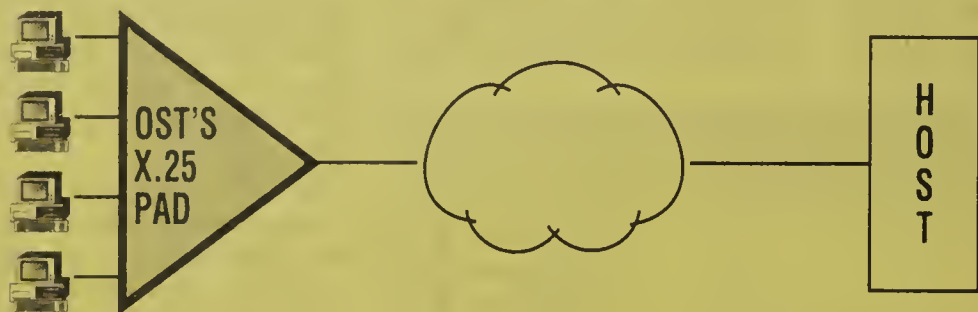
■ Interlink Computer Sciences, Inc.: Said it did not have routers that operated in both local and remote mode.

■ Digital Equipment Corp.: Said it did not have a truly multiprotocol router, but rather the device encapsulated one protocol within another.

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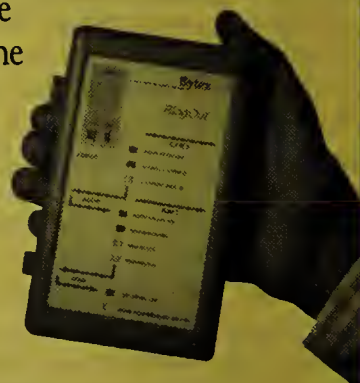
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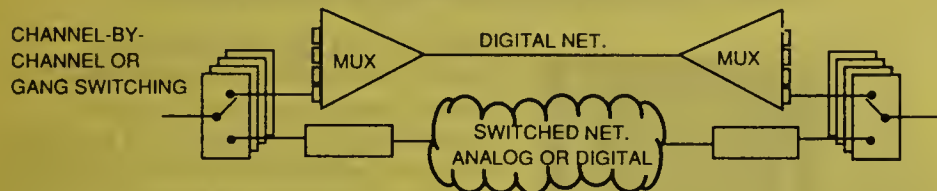
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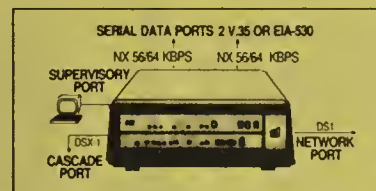
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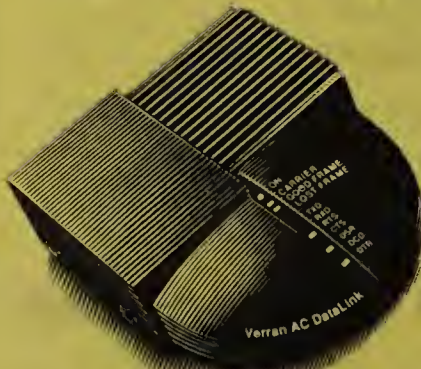
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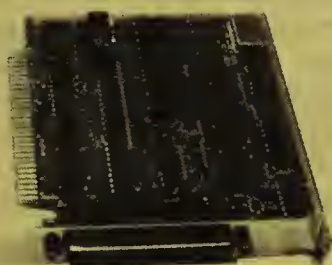
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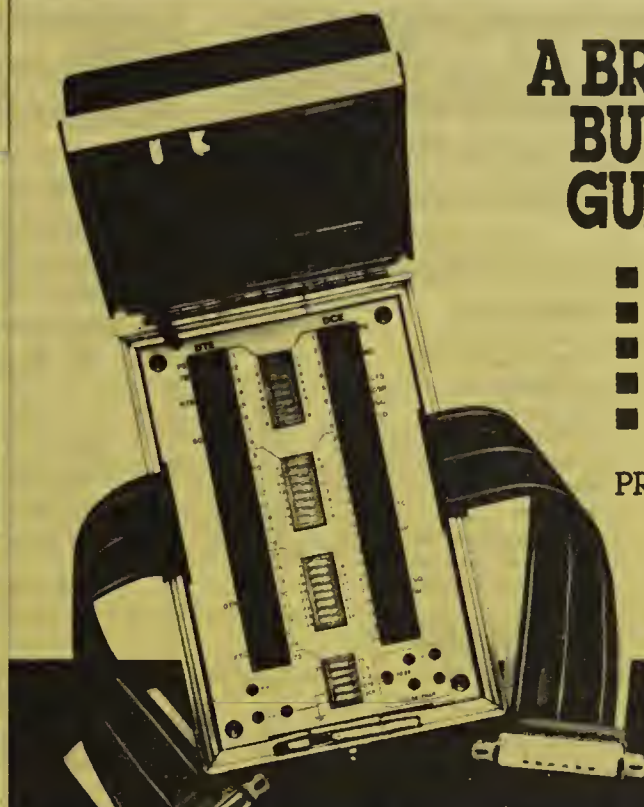
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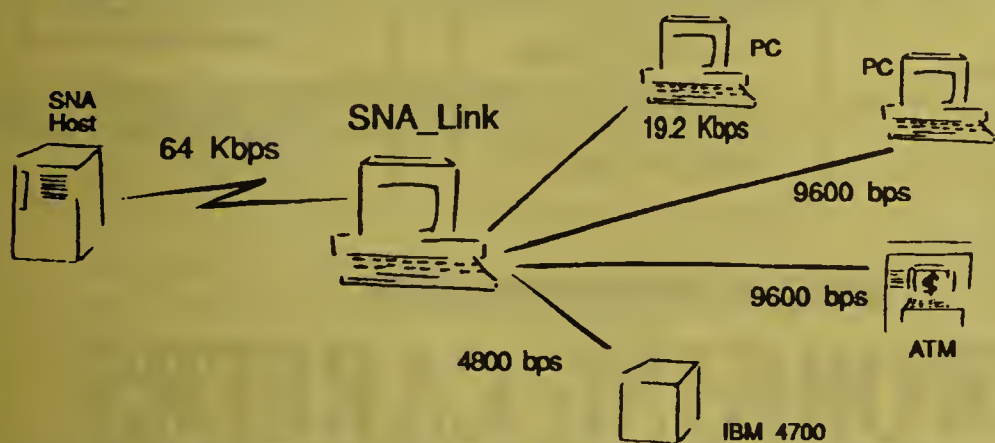


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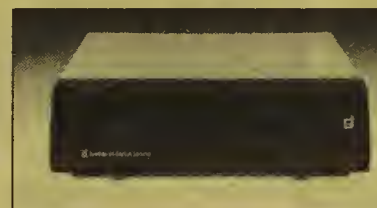
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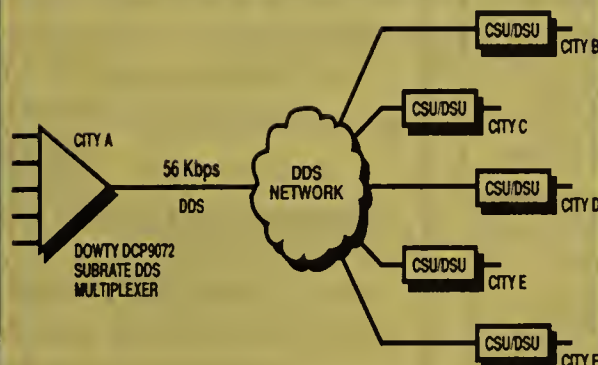
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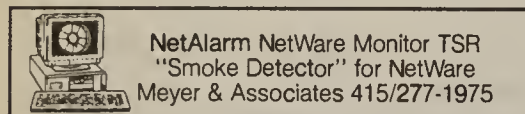
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A readers' guide to the terms of SNA

■ **Advanced Peer-to-Peer Networking (APPN)** — IBM's distributed network routing and control architecture, which provides dynamic directories and is designed to allow computers to communicate as equals.

■ **Advanced Program-to-Program Communications** — Another term for LU 6.2 sessions.

■ **BIND command** — The command sent from one logical unit to another for initiating a session.

■ **Control point** — A type of network-accessible unit in APPN that replaces the System Services Control Point (SSCP) and physical units (including PU 2.1, which is now called the Type 2.1 node) of traditional Systems Network Architecture.

■ **Domain** — In traditional SNA, all the devices and nodes — including physical resources, software and micro-code resources — managed by an SSCP. In new SNA with APPN, it is the resources connected to a network node.

■ **Logical unit** — A net-accessible unit used by end users to access SNA services and establish communications.

■ **Network-addressable unit** — In old SNA, sources and destinations of messages. There are three types: SSCPs, logical and physical units. In new SNA with APPN, sources and destinations of messages. There are two types: control points and logical units.

■ **Network Control Program (NCP)** — The control program that runs on an SNA communications controller.

■ **Node** — A composite machine that contains SNA network-accessible units.

■ **Peripheral node** — In old SNA, any node that is neither a System/370 or 390 host nor a communications controller.

■ **Physical unit** — A network-addressable unit that provides local directory and control functions for a traditional SNA node.

■ **Session** — A virtual connection between two network-addressable units for exchanging information. User-to-user communications occur over logical unit-to-logical unit sessions.

■ **Subarea node** — Switching nodes in pre-APPN SNA consisting of System/370 and 390 hosts and communications controllers/NCPs, thus named subarea architecture for pre-APPN SNA. Replaced by net nodes in APPN. In old SNA, a System/370 or 390 host or communications controller, which communicates with its own peripheral nodes and also with other subarea nodes.

■ **System Services Control Point** — A special network-addressable unit in VTAM that processes initiation and termination requests for all sessions and acts as a conduit for net management information flowing to NetView.

■ **VTAM** — The program that runs in an IBM System/370 or 390 host to provide SSCP and host physical unit functions.

— Atul Kapoor

The new SNA

continued from page 40

ration integrates all logical unit types in the same APPN/subarea network.

On a network such as the one depicted in Figure 2, adventurous users can even mix Network Basic I/O System applications with APPN and dependent logical units. Nothing in the scenario prevents NETBIOS applications from running on Network 1 or Network 2.

In addition, by installing IBM's LAN-to-LAN Over WAN software, which runs on a personal computer, in Network Node 2 on Network 1 and in Network Node 3 on Network 2, we can also use the SNA subarea network for NETBIOS sessions between

Network 1 and Network 2, as well as for APPC and other dependent logical unit traffic.

Of course, users would have to make sure that they have a proper balance between batch and interactive applications and sufficient bandwidth to satisfy their response time requirements.

Given the large installed base of subarea networks, the configuration in Figure 2 will be the most likely scenario in the early years of APPN. It integrates APPN with the existing subarea network, allows the user to manage and control the net with NetView, and supports all logical unit types.

However, because VTAM and NCP do not support control point sessions, the sys-

tems administrator will still have to manually define nodes in the subarea network.

APPN implications

Clearly, APPN introduces significant capabilities to SNA. Early users may find the ability to conduct dynamic directory searches even more attractive than APPN's network node routing function. A network where no remote logical units or routing tables have to be administered should be a major relief to systems administrators.

However, some users may be apprehensive about implementing APPN because it is a new architecture with new products and no proven track record.

Some early performance evaluations
(continued on page 53)

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continued from page 43

ets. So the factors that did cause changes in the local routing tests were masked by the serial link's relatively slow speed in the remote routing tests.

Conclusions

The central conclusion from this series of tests is that router vendors are keeping up with the increasing demands of users and network designers for speed. Three of the routers in this study adequately handled network traffic while being placed under a very heavy work load.

The Cisco router especially proved itself, Moyer says. He notes that both the Wellfleet and Cisco routers stood out in these tests.

"We were very impressed with the capabilities of these two routers," he says. "The biggest problem we had in testing them was making sure our test equipment could keep up with them."

The Proteon P4100+ was not designed to handle the kind of traffic used in this test.

"Proteon sent us a prototype of a new model designed for the levels of network traffic generated in this study, and that unit should bring their performance up to the range of their competitors," Moyer says. "But we were not able to test it in time for this article."

The tests clearly show that packet size is the crucial determinant of throughput. Traffic made up of 64-byte packets can drive router throughput to more than 10,000 packets per second but only at a cost of thousands of dropped packets. These dropped packets must be handled by higher protocol layers and sent again, which will put more stress on a perhaps already overburdened network.

For the larger packet sizes, throughput does not look as high in terms of packets per second, but few are dropped. Thus, the link functions more efficiently.

The IFG, which is another measure of how busy the link is, also had a strong effect. While the packet-per-second rating varied somewhat, each router dropped a significantly greater number of packets at the small gap size.

Changes arising from different protocols was much less pronounced — on the order of 5% to 10% at the most. Where differences were noted, IPX was generally slower than IP, but again the change was slight.

In each test, the most surprising result was the number of packets dropped.

For example, 10,000 packets per second forwarded is wonderful performance, but if the cost is 3,000 packets per second dropped, then overall network performance will be seriously degraded. ■

Reevaluating Proteon's router

To be useful, descriptions of product tests must be straightforward in discussing products that perform well and those that perform poorly.

In this case, three of the tested routers had characteristics that would allow a user to classify them as high performance. In our view, one router did not — the Proteon, Inc. P4100+.

For this test, Proteon sent the P4100+ and a prototype of a new router, which the vendor subsequently released as the ProNET CNX 500. However, our

1,518-byte packets, while the Cisco Systems, Inc. CGS router passed more than 12 times as many packets per second in the 64-byte packet test.

In some tests using a large interframe gap, the Proteon router's performance improved. For example, when 1,518-byte IP packets were sent to the router, the P4100+ routed 400 packet/sec while the Cisco router handled 460 packet/sec.

The Cisco router's performance was the same as the 3Com Corp. NETBuilder router, which

percentages of packets dropped to packets transmitted stayed about the same for the 64 and 594-byte packets but increased to 48% for 1,518-byte packets.

Remote routing

One problem occurred in setting up for the testing that may emerge to trouble users. It involved a problem of human communications, according to technical staffers at Enterprise Technology Center, Inc. (ETC) of Houston, the company that conducted the test in conjunction with *Network World*. The Proteon P4100+ could not be configured for remote routing. "Several conversations with Proteon headquarters were unable to resolve this," says Michael Moyer, ETC Network Test Series Manager.

The discussions involved the many switches and jumpers on the P4100+'s I/O boards. These must be set for the specific application for which the router would be used.

ETC reports that it received conflicting information from Proteon's technical support staff on what the correct configuration for the remote routing test should be.

In one case, ETC staffers were told the settings in the manual were correct and the shipped products were configured incor-

Version 9.0 started shipping in September 1990. Proteon began shipping Version 10.0a in February of this year. The stated difference between the two versions is a features upgrade that incorporates newer algorithms for Open Shortest Path First routing.

One visible difference between the performance of the 9.0 software and the 10.0a was the number of collisions generated at high packet rates. Collisions were increased with the new software, meaning that performance might suffer.

With Version 10.0a, the number of collisions detected during the high-stress, large-packet transmission test was approximately 600 per second. The 9.0 had only about 200 collisions per second in the same test.

After ETC's technical staff compared the two routers to ensure that they were testing the same device, they tried to run Version 10.0a software on the original hardware. But software Version 10.0a could not read the configuration stored in the original P4100+'s nonvolatile memory.

Installing this new version on the original P4100+ would have required ETC staffers to reconfigure that router from scratch. ETC opted not to do this, deciding to concentrate on the

In tests using Novell, Inc.'s Internetwork Packet Exchange protocol packets, the P4100+ did not match the performance level of the other routers.

▲▲▲

policy for the router test was to include only products that were commercially available at the time. That meant we could only test the P4100+ and not the prototype.

In the tests, the Proteon P4100+ performed at a much lower level than the other routers in nearly every case. The exception was the remote routing test, where the P4100+ was the top performer.

When asked about the results, a Proteon representative replied that the P4100+ was designed to be a low-cost router for low-end applications and for applications where the router would be used to connect remote locations.

The ProNET CNX, a family of multiprotocol routers based on a Reduced Instruction Set Computer processor, is designed to address the high-end routing needs of users.

Although the ProNET CNX would presumably perform better than the P4100+, it was not possible to confirm this through the tests.

Examining the results

In tests of the P4100+, when Internet Protocol packets were transmitted using the smallest interframe gap (9.6 microsec), the P4100+ routed — at best — half the packets per second of the other routers tested. In this test, the P4100+ forwarded 390, 640 and 1,040 packet/sec for packet sizes of 1,518, 594 and 64 bytes, respectively.

In contrast, the Wellfleet Communications, Inc. LN router passed more than twice as many

also routed 460 packet/sec. The Wellfleet router handled 600 packet/sec.

A big difference in performance between the P4100+ and other routers showed up in the 64-byte packet test. In this case, the Cisco router processed 11,160 packet/sec while the Proteon router handled only 1,090 packet/sec.

In this test, the other routers also did much better than the Proteon router. The 3Com and Wellfleet routers handled 6,300 and 7,560 packet/sec, respectively.

In tests using Novell, Inc.'s Internetwork Packet Exchange (IPX) protocol packets, the P4100+ once again did not match the performance level of the other routers.

For example, in tests with 594-byte packets and a large interframe gap, the P4100+ routed 590 packet/sec while the other three routers handled from 1,180 to 1,500 packet/sec.

The performance discrepancy grew when 64-byte packets were used. In this case, the P4100+ routed 490 packet/sec while the other units were routing between 10 and 20 times more packet/sec. The Cisco router was routing 9,330 packet/sec, for example.

The P4100+ also dropped significantly more packets than the other routers tested. In tests using a large interframe gap, the P4100+ dropped 17%, 41% and 86% of the packets presented to it for 1,518-, 594- and 64-byte packets, respectively.

When a small interframe gap was used between packets, the

rectly. At another time, ETC staffers were told the manual was incorrect and the shipped products were configured correctly.

Because of the unusually poor performance figures for the P4100+ and on the chance that the first shipped model might have been a defective unit, ETC and *Network World* decided to test a second unit.

However, the second unit was not identical to the first. While the second router's hardware was exactly the same as that of the first router tested, the second router's I/O cards were configured properly — so that the remote test could be performed — and it had a newer version of driver software. The original router had Version 9.1, the new router had Version 10.0a.

new router.

In remote routing tests using 1,518- and 594-byte packets, the second P4100+ was slightly better than any of the other routers tested for this comparison.

The P4100+ did do better than the other tested routers in forwarding 64-byte packets over a remote link.

Using a small interframe gap and 64-byte packets, the P4100+ passed 130 packet/sec. In contrast, the best the other routers could do was about 105 packet/sec.

Summarizing all tests and despite the P4100+'s high performance in the 64-byte remote link test, we concluded that this router is not necessarily the best choice for networks with heavy traffic.

— Salvatore Salamone

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How open is IBM's idea of open?

IBM's claims of openness notwithstanding, Systems Network Architecture is more closed today than it was a few years ago. Advanced Peer-to-Peer Networking's (APPN) net node architecture is also more closed. Other than bad press for IBM, what does this mean?

Closing selected VTAM and Network Control Program interfaces has not stopped NCR Comten or Amdahl Corp. from providing some fine alternatives to IBM communications controllers. Nor has it stopped Systems Center, Inc. from providing NetMaster, a highly rat-

SNA is more closed today than it was a few years ago.

▲▲▲

ed network management product, as an alternative to IBM's NetView.

Similarly, unavailability of network node-to-network node protocols shouldn't prevent other vendors from providing extensions or compatible alternatives to APPN. Building third-party products using the end node interface may be a better choice than using the network node interface, anyway, because the former is much simpler and more stable than the latter.

With a little thought and ingenuity, third-party vendors can provide almost the same functions by using end node specifications published by IBM as they could by using network specifications.

— Atul Kapoor

The new SNA

continued from page 51

from IBM do seem encouraging, though. In one current internal IBM implementation, approximately 75 workstations were configured to work concurrently as user workstations and network nodes.

The typical workstation used was a Personal System/2 Model 80, with a minimum of 10M bytes of main memory, running under OS/2 Extended Edition on a token-ring LAN with a mix of common LAN applications, servers and OfficeVision.

No perceptible degradation in performance was reported by users as workstations went through their occasional broadcast processing in order to update

distributed directories.

Customers using the AS/400 have been implementing even larger configurations for some time now. Of course, new customers will have to make their own evaluations of APPN's performance based upon their workstation configurations, LAN hardware and software, and traffic profiles.

The criticism that APPN specifications do not include support for logical units other than LU 6.2 seems somewhat misplaced. Perhaps, it should be emphasized that the primary focus of APPN, by intent, is to support peer-to-peer applications.

In any case, as is evident in the scenario depicted in Figure 2, we can support non-APPC logical units on an APPN network through existing host gateways.

While peer-to-peer communications may be new to SNA, it has been a part of Transmission Control Protocol/Internet Protocol, Open Systems Interconnection and LAN architectures ever since their inception. Nevertheless, APPN will continue to transform traditional SNA.

By the time IBM implements APPN in VTAM and NCP, OSI may be a working alternative to proprietary implementations.

However, for OSI implementations using private X.25 networks for transport, users may still have to use a proprietary internal transport architecture. For large user companies with a significant investment in IBM technology, SNA is still the most familiar and most extensively supported solution around. **Z**

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Letters

continued from page 33

new SystemPro support strategy," *NW*, April 29). I have a few thoughts to add.

I agree that Compaq's direct support pricing is way out of line. Hewlett-Packard Co.'s price for its equivalent service is \$45 per call, and other suppliers charge even less. Compaq's service is not really positioned as a serious attempt to take support responsibilities away from its resellers.

It is, however, a harbinger of things to come from Compaq. Eventually, Compaq will have to offer something directly at a decent price. Selling machines such as the SystemPro without a high-quality support infrastructure behind it is not smart.

On the other hand, users must recognize that support is an important value-added component to their data solutions and must be purchased at a fair price.

Jeffrey Spector

PC LAN support program manager
Hewlett-Packard Co.
Mountain View, Calif.

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April 30, 1990

U.S. to study Soderblom token patent

By Laura Didio
Senior Editor

WASHINGTON, D.C. — In a move that could spell trouble for Olof Soderblom's token-passing patent and monetary relief to his 50 licensees, the U.S. Patent and Trademark Office has agreed to reexamine the validity of Soderblom's patent.

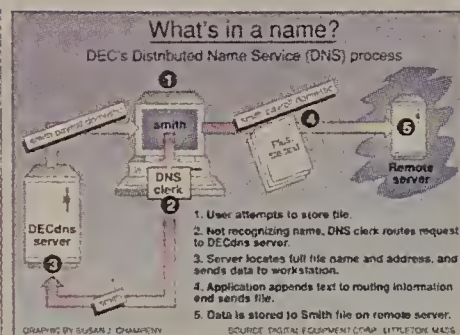
In its 1½ page decision, the Patent Office stated that the reexamination request from an anonymous vendor was granted in view of earlier patents issued to four engineers — including two from AT&T Bell Laboratories — before Soderblom was granted his patent in 1981.

"A substantial new question of patentability affecting Claims 25 to 33 of U.S. Patent No. 4,493,948 to Soderblom is raised by the request," the Patent Office statement said.

The 10 claims in question deal with open and closed data transmission loop schemes and are central to the issue of whether Soderblom's existing patent is applicable to today's token-ring and fiber Distributed Data Interface local-area network technologies.

Invalidation of the patent or amending even portions of the patent could effectively render null and void the current licenses.

(continued on page 62)



DEC describes benefits of X.500 directory services

X.500 will extend DNS offering to incorporate non-DEC devices in DECnet Phase V directories.

Later this year, Digital Equipment Corp. is expected to announce DECnet Phase V, a major revision of its network software that will support the full suite of Open Systems Interconnection protocols.

According to Jane Brewer, DEC's product marketing manager for enterprise networking within DEC's Telecommunications and Networks Organization, one key component of that announcement will be

support for the X.500 directory services standard, which promises to give network administrators greater control over the hardware and software elements in their networks.



In an interview with *Network World* Assistant Managing Editor Charles Bruno, Brewer described the full potential of X.500 directory services and laid out DEC's strategy to support the technology within DECnet Phase V.

(continued on page 59)

Microsoft to market LAN Manager direct

Software giant to sell NOS to Compaq resellers to stabilize LAN Manager camp, jump start sales.

By Laura Didio
Senior Editor

REDMOND, Wash. — In an attempt to boost lagging sales of its LAN Manager network operating system, Microsoft Corp. last week announced it will sell a version of the product directly to select Compaq Computer Corp. value-added resellers.

Microsoft's decision to put its marketing muscle directly behind LAN Manager is viewed as crucial if the product is to compete successfully with Novell, Inc.'s NetWare, which commands 60% of the network operating system market today. LAN Manager has only been available through OEMs to date.

"By selling its own version of LAN Manager, Microsoft is giving users freedom of choice," said Craig Burton, executive publisher of the *Clarke Burton Report*, a monthly research magazine. "Users will no longer be constrained to buying versions of the product that only work with a particular OEM's hardware. This will help accelerate the acceptance of LAN Manager."

Jonathan Yarnis, vice-president of the personal computer service at Gartner Group, Inc. in Stamford, Conn., agreed. "The

move solidifies and stabilizes the LAN Manager camp and will spur application development.

"Microsoft and its OEMs have to present a unified front, especially in light of Novell's merger

(continued on page 6)

Fax facts

Average:	
Number of users per fax machine	10 to 50
Number of pages transmitted per day	15
Cost per page of transmission	35 cents
Cost per sheet of paper	5 cents
Cost of a fax machine	\$1,500

GRAPHIC BY SUSAN J. CHAMBERN

Net execs try to tame fax monster

By Tom Smith
New Products Editor

The explosive growth of facsimile machines has created a costly monster of which few companies are aware, let alone able to control.

Most large companies don't even know how many fax machines they have or how much they are spending on dial-up fax transmissions.

"It's like trying to manage envelopes or pieces of paper," said Bob Craig, vice-president of international network planning for The Chase Manhattan Bank, N.A. in New York. "People don't think it's worth the cost of managing it."

Yet the costs can be staggering. Annual transmission costs can be in the tens of millions of

(continued on page 8)

NETLINE

AT&T TRIDOM plans to trial a pan-European VSAT network with two users. Page 2.

A TARIFF IS USER is the loser in a heated battle between NCI and AT&T. Page 2.

VENDORS AIMING for FDDI interoperability form a testing consortium. Page 2.

3COM ELECTS Benhamou to

the post of president. Page 4.

AMEX AWARDS MCI with a service contract that could be worth up to \$100m. Page 4.

U.S. SPRINT EXTENDS VPN services into international markets. Page 4.

PRIVATIZING TELECOM in Eastern Europe is a question of capital. Page 45.

NEWSPAPER

FEATURE

Telecom privatization will aid int'l users

By Norman Lerner
Special to Network World

Most countries — industrialized, developing, capitalist and socialist — are at some stage of restructuring their telecommunications systems in order to accommodate and take advantage of the great political and economic changes now sweeping the globe.

In many places, this restructuring is taking the form of privatization of formerly nationalized telecommunications systems.

This important trend raises major questions for multinational users of telecommunications services, including: Where is this happening and why? How will it affect the way we do business? And what will be the long- and short-term effects on telecommunications services to and from these countries?

This article examines the trend toward privatization in

(continued on page 38)

The results are in and *Network World* is the clear leader. The 1990 Wall Street Journal/ICA Member Study is conducted among members of the prestigious International Communications Association (ICA), an organization whose representatives purchase \$16 billion of information technology products and services each year.

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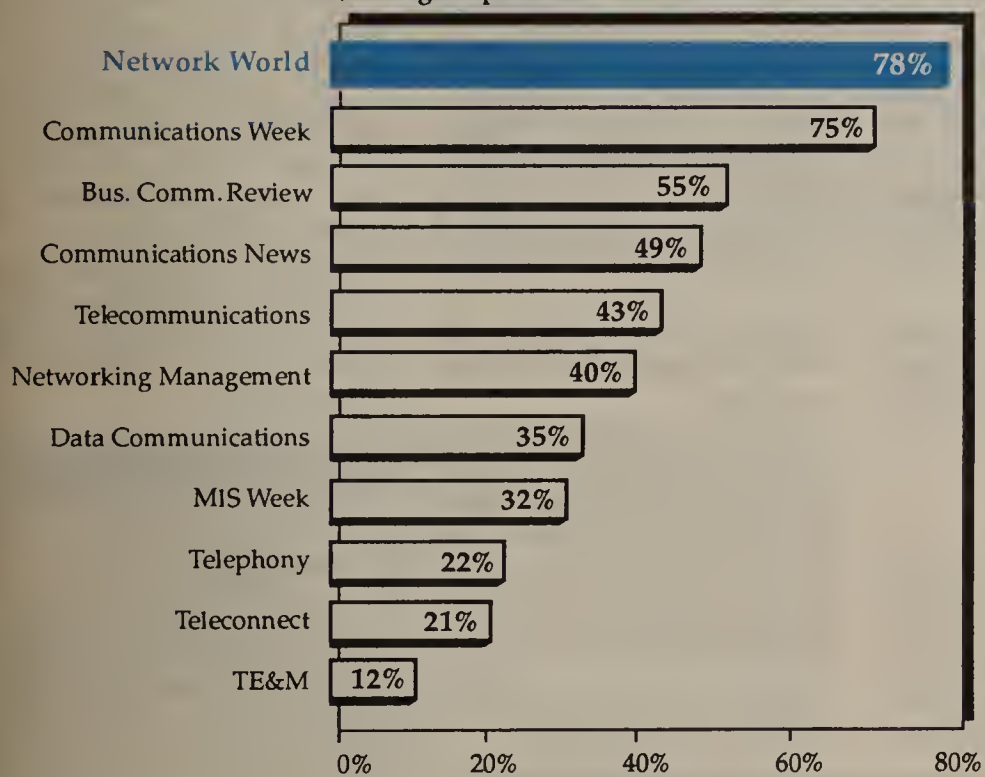
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Domestic Regular Readership

(Among Respondents with Domestic Networks)

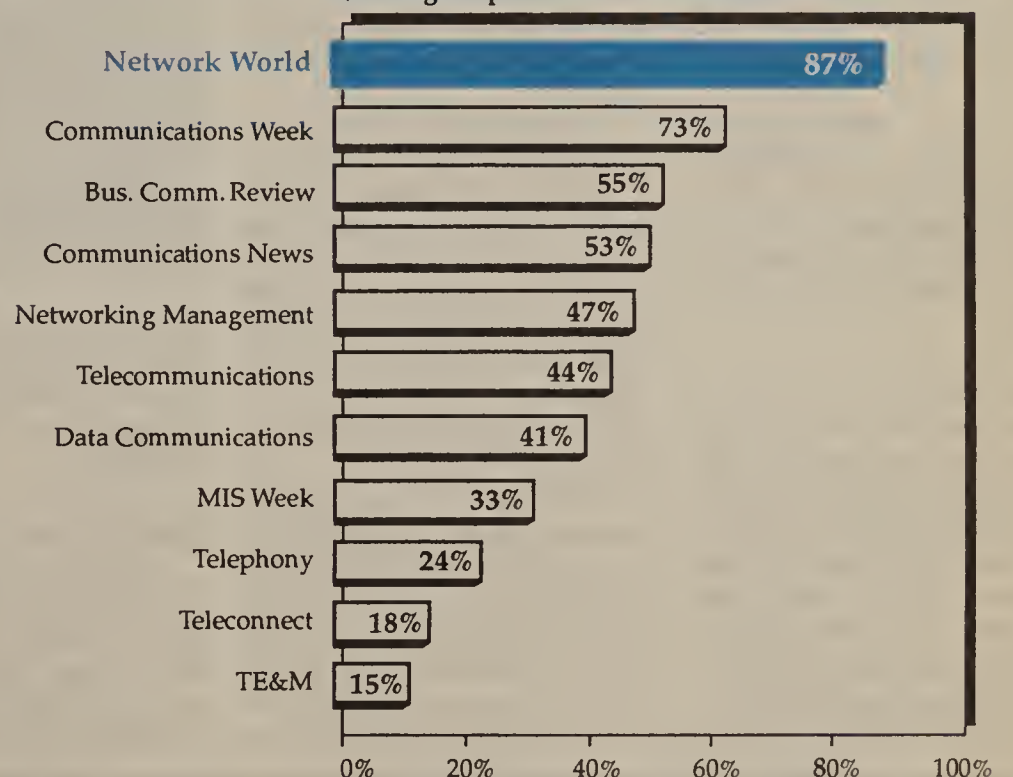


Base: 336 Respondents

Regular readership is at least three out of four issues.

International Regular Readership

(Among Respondents with International Networks)

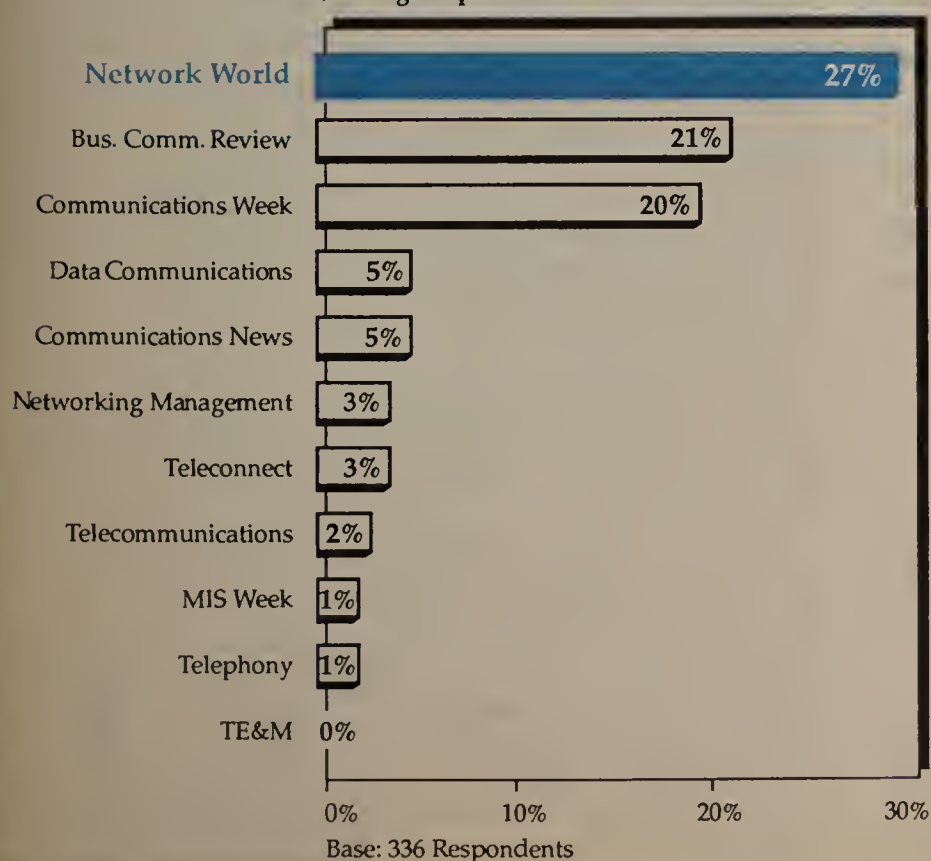


Base: 165 Respondents

Regular readership is at least three out of four issues.

Domestic Most Important/Useful

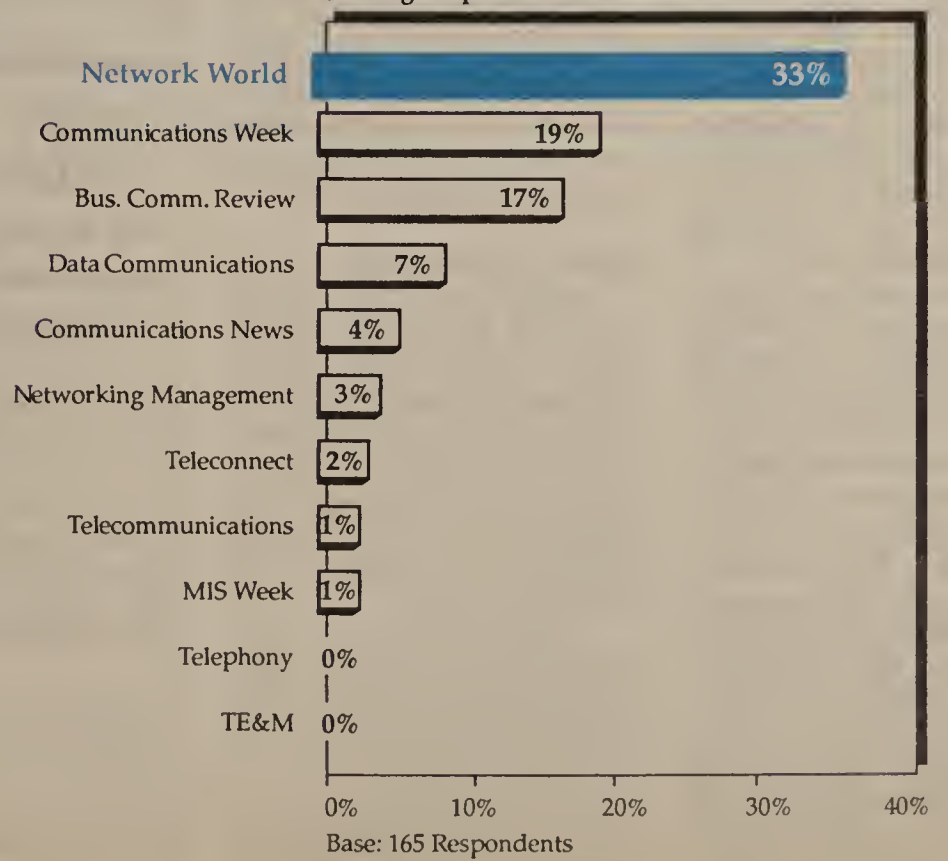
(Among Respondents with Domestic Networks)



Base: 336 Respondents

International Most Important/Useful

(Among Respondents with International Networks)



Base: 165 Respondents

Spec details use of FDDI

continued from page 2

The vendors demonstrated interoperability between earlier versions of FDDI-over-shielded twisted-pair products by connecting workstations with one vendor's board to ports on others' concentrators.

Shielded twisted pair is currently used to support 10M bit/sec Ethernet as well as 4M and 16M bit/sec token-ring networks.

The joint specification will be available at no cost to any vendor and will be submitted to ANSI's X3T9.5 Twisted Pair — Physical Layer Medium Dependent committee for adoption as a standard (see "Firms integrate efforts," this page).

The specification will enable vendors to replace the \$200 to \$300 fiber transceivers used on existing boards with \$25 to \$50 transceivers for shielded twisted pair.

Like fiber, shielded twisted pair will support a 330-ft link between desktop devices and a shielded twisted-pair port on an FDDI concentrator, a hub that provides access to a fiber FDDI backbone.

Spurs action

That price reduction is likely to encourage end users to support FDDI to the desktop, according to Chipcom, DEC and SynOptics. AMD and Motorola said increases in adapter board sales will enable them to mass-produce FDDI chipsets, which will result in even further price reductions.

"What the vendors are trying

to do here is jump start the FDDI-to-the-desktop market," said Janet Hyland, director of network strategy research at Forrester Research, Inc., a consulting firm in Cambridge, Mass.

It may also spur fiber transceiver vendors to lower their prices, she said. "This will give the optical component vendors a real scare."

Answering users

The vendors said the specification was developed in response to user demands to run FDDI to the desktop over existing cable plants. User pressure for alternative media has been much greater than anticipated, said Karl Pieper, DEC's FDDI marketing manager.

In fact, 34% of 130 corporations interviewed last spring said they already had shielded twisted-pair wire installed, according to a study by Information Transport Systems, a wiring consulting and engineering firm in Burlington, Mass.

But many of those users do not require the bandwidth provided by FDDI. Large financial institutions, insurance companies and brokerage firms with shielded twisted pair do not require 100M bit/sec of bandwidth, said Marty Palka, senior industry analyst for networking at Dataquest, Inc., a market research firm in San Jose, Calif.

Others agreed. "Cost is not as important as the vendors say it is," said Doug Gold, director of communications research with International Data Corp., a market research firm in Framingham, Mass. Rather, the need for bandwidth to support applications

Firms integrate efforts

Proposals presented to a standards body last August formed the basis for the joint FDDI-over-shielded twisted pair specification released last week by a group of five vendors.

Last year, Chipcom Corp., Digital Equipment Corp. and SynOptics Communications, Inc. each presented varying plans for Fiber Distributed Data Interface-over-shielded twisted pair to the ANSI X3T9.5 Twisted Pair — Physical Layer Medium Dependent X3T9.5.

The committee will decide this summer whether its standard will cover FDDI-over-shielded and unshielded twisted pair or just shielded twisted pair. It hopes to have a full standard by the end of 1992.

Chipcom, DEC and SynOptics teamed up to iron out the differences in their plans. Advanced Micro Devices, Inc. and Motorola, Inc. then joined that effort.

Vendors acknowledged FDDI-over-unshielded twisted

pair would be more desirable than FDDI-over-shielded twisted pair because unshielded twisted pair is more widely used and less expensive.

However, FDDI-over-unshielded twisted pair is a greater technological challenge and may require changes in the FDDI standard.

"The problem on the unshielded twisted-pair side is a trade-off between distance and emissions," said David Fowler, Chipcom's vice-president of marketing.

In order to bring electromagnetic emissions from FDDI-over-unshielded twisted pair within Federal Communications Commission limits, vendors need to limit the distance workstations and microcomputers can be from an FDDI concentrator to 165 feet. The jointly developed FDDI-over-shielded twisted pair specification supports a 330-foot link.

— Jim Brown

that involve large file transfers among workstations — like computer aided design — will be the primary force driving users to install FDDI.

Lower prices win out

Wiring plan consultants sided with DEC and its partners, saying lower priced shielded twisted-pair adapter boards will tip the scale in favor of FDDI-over-shielded twisted pair, especially

because the cost of fiber is now only slightly higher than shielded twisted pair.

According to Edward Barrett, president of Hi-TECH Connections, Inc., a Reading, Pa., firm that designs and installs wiring plans, it costs an average of \$420 per drop to install Type 1 cable and \$450 per drop for fiber. □

Senior Editor Eric Smalley contributed to this report.

Analysts advise postponing buys

continued from page 2

as signs that a market shakeout has already begun to affect the industry's smaller vendors as well as financially strapped firms.

Given AT&T's successful bid for NCR Corp. earlier this month, any network vendor is a fair target for a merger or acquisition, said Henry Nothhaft, president and chief executive officer at David Systems, Inc., a Sunnyvale, Calif., wiring hub maker.

Harrison named such vendors as Timeplex, Inc., Network Equipment Technologies, Inc. and such newly public companies as Chipcom Corp. and Xyplex, Inc. as some of the network industry's possible acquisition targets during the next two years.

The leading intelligent wiring hub vendors are likely suitors of vendors of bridge/routers, terminal servers and other inter-networking gear, according to analysts.

IBM, Digital Equipment Corp. and other systems vendors that often enter new markets only after they've matured, are also pos-

sible buyers with the resources necessary to develop and support integrated LAN/WAN product lines, analysts added.

Tad Witkowitz, founder and president of CrossComm Corp., a Marlborough, Mass., internet-working vendor, said industry consolidation is inevitable.

"Leading-edge technology only takes a [vendor] so far," he said. "There comes a time when you need to support the technology with marketing muscle."

Quest for Holy Grail

Vendors are on a quest to produce "the Holy Grail product suite," which would feature scalable, modular enterprise network switches that integrate LAN wiring, bridging/routing, channel networking and wide-area bandwidth management under a single network management system, Harrison said.

"Software content and multifunctionality — as well as radically new architectures — will drive the business," he wrote in his research brief.

According to Harrison, multiplexers, packet switches, routers and other network gear have be-

come commodities, making the industry ripe for consolidation.

He said the industry has been slowly evolving into a market shakeout, the first indication of which came from the formation of joint marketing alliances. The advent of technology alliances —

“There comes a time when you need to support technology with marketing muscle.”

▲▲▲

such as the card-level integration of routers into intelligent wiring hubs — was another factor that made acquisitions and mergers more palatable among vendors.

Users proceed cautiously

Now that the third wave of consolidation — mergers and acquisitions — appears imminent, users should exercise extra caution when buying, he said.

"Those users who want to leap to the next-generation network platform would be wise to wait until all this consolidation settles down," Harrison said. They should, however, keep making tactical upgrades to their nets.

Jeff Held, a partner at the Network Strategies practice of Ernst & Young, a Fairfax, Va., consulting firm, said users should focus on getting technology investments to pay back in two years or less. He cautioned users to avoid long-term commitments to products that may be discontinued or to vendors whose business strategies could be altered as a result of market consolidation.

Users acknowledged that industry consolidation adds uncertainty to the market, but overall, they expressed relief.

"Right now, there is so much variety in the industry, it is difficult to narrow it down to a vendor, let alone a technology," said Lou LeMarr, network system programmer for ServiStar/Coast To Coast Corp. in Denver. "It would be refreshing to have a little consolidation if that means more enhancements and less confusion." □

FCC devises plan for bandwidth

continued from page 4

trum reserve report, due in September from its Office of Engineering. That report will guide the FCC in the planned proceedings.

Richard Firestone, chief of the FCC's Common Carrier Bureau, said the report will include a review of the frequency bands, users of the bands and services provided as well as which alternatives, such as fiber-based services, are available to those users.

The report is expected to include extensive cost analysis of the systems in use as well as migration costs to other wireline or non-wireline alternatives.

However, the spectrum reserve proceeding is not likely to resolve the myriad of questions surrounding the deployment of PCN in the U.S., such as exactly which services should be licensed, Sikes emphasized.

"The spectrum reserve is designed as a long-term reserve," Sikes said. "It is intended to provide a reserve for technologies we don't know about yet."

PCN can only be defined today as an emerging low-power, microcell-based technology viewed as the next step in cellular communications. □

NETWORK WORLD

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Ins and outs of renegotiating

continued from page 4

grabs, which was a big surprise to us."

The source said AT&T wanted to renegotiate everything from pricing and special features to the terms and conditions of the arrangement. "Negotiating things we had in the original deal was a bloodbath," he said.

Lawyers who have helped users renegotiate Tariff 12 arrangements say that scenario is typical.

"This is a fairly common occurrence," said Henry Levine, an attorney with Morrison and Foerster, a Washington, D.C. law firm. "AT&T can wipe the slate clean and start from the beginning, which means [users] may lose items or have to give them up in return for new concessions."

This can make a renegotiation an adversarial process.

"A Tariff 12 renegotiation cannot be a nice negotiation. You have to go for the jugular in every meeting," said the insurance company's network manager.

On friendlier terms

Other users have had more civil dealings with AT&T in the renegotiation process. "The negotiations were intense and time-consuming, but I wouldn't say

they were rough," Jewell said. "We didn't hit anything that caused either of us to walk away from the table."

American Airlines viewed AT&T as a strategic partner rather than an adversary in the negotiations, he added.

AT&T announced in February that it renegotiated and vastly expanded its Tariff 12 deal with the airline to make it one of the largest custom network deals to date. The original deal, filed in November 1988, was worth a minimum of \$166.5 million over five years. The revised deal, however, will almost double in size to a minimum of \$300 million for the same time period.

"Our situation was pretty straightforward," Jewell said. "We were changing from a network of multidrop analog lines to a network of point-to-point digital lines, so our original deal had to change."

American Airlines set a time frame for the negotiations and gave AT&T a price range within which the value of the contract had to fall, Jewell recalled. The teams never reached an impasse.

"I don't think there was anything we thought we won great concessions [on or gave up]," Jewell said. "We didn't have any deal breakers or we wouldn't have had a deal." □

T-3, ATM on tap for StrataCom

continued from page 1

would not comment further.

WilTel, which uses the IPX to support its WilPak frame relay service, was installing the MT3 last week and will beta-test it, said Robert Gourley, WilTel's manager of technical support.

Nick Lippis, principal at Northeast Consulting Resources, Inc. in Boston, said the MT3 functions like an M13 multiplexer, providing a carrier-standard, channelized T-3 interface. Each MT3 card comes with two T-3 trunk interface ports and 14 local T-1 input ports. A maximum of four MT3 cards can be used per IPX node, for a total of eight T-3 trunks and 56 T-1 inputs.

The T-1s can come from the IPX or sources such as private branch exchanges or routers.

According to Lippis, the MT3 module could be used to connect IPXs with T-3 links in point-to-point configurations or to consolidate multiple T-1s over a T-3 for access to carrier-based services, including frame relay.

The MT3 does not, however, provide full mesh networking functions but supports a drop-and-insert capability and is suitable for ring configurations, said Lippis, who was briefed on the product last week.

Howard Hecht, program director at Gartner Group, Inc., a Stamford, Conn., consultancy, said the MT3 module has its own multiplexing and switching matrix. That means StrataCom did not have to increase the capacity of the IPX's 32M bit/sec bus.

The MT3 fits into a single card slot on the IPX Model 16 or 32 and can be managed by StrataCom's existing IPX management systems, Hecht said.

In providing a T-3 upgrade for the IPX, StrataCom followed such rivals as Network Equipment Technologies, Inc. and Newbridge Networks, Inc. Timeplex, Inc. and other firms do not offer an upgrade to their T-3 switches from their T-1 equipment.

Lippis said the T-3 capability

will be a boon for users and carriers — such as CompuServe, Inc. and WilTel — which use the IPX to support frame relay because it will allow them to support far more T-1 frame relay access links.

WilTel's Gourley said he expects demand for frame relay service in New York and San Francisco will soon reach the point where T-3 is required. If the test goes well, the company expects to roll out T-3 support in and possibly between those cities.

StrataCom will also ship an optional four-port High Speed Serial Interface (HSSI) module with the MT3. HSSI is an emerging standard for a physical data communications equipment interface that operates at any speed between 1.5M and 52M bit/sec.

The HSSI module will let users dedicate multiple T-1 channels to a single application.

StrataCom's ATM module will be based on emerging CCITT and ANSI standards for cell relay switching, which define a fixed-length, 53-byte cell.

The ATM module also takes up a single IPX card slot and works in tandem with the MT3 module for users that want channelized T-3 trunks supporting hybrid private/public services. It also works on its own to provide a nonchannelized T-3 link to ATM-based services such as SMDS. With the module, the IPX will be able to support mesh networks of T-3 links.

StrataCom also plans to deliver Synchronous Optical Network (SONET) and European T-3 versions of the ATM module, Lippis said.

And WilTel is looking forward to the IPX's ATM capability.

"Our long-term strategy is to develop an ATM backbone using T-3 and/or SONET," Gourley said. "We'll probably evolve into a platform that has IPXs as feeder nodes into a larger ATM switch."

Pricing for the MT3 module starts at \$18,750 for a redundant configuration. Pricing for the ATM module has not been determined, but Hecht said it would cost about \$20,000. □

AT&T ready to bargain

BASKING RIDGE, N.J. — An official at AT&T recently said the carrier is willing to reduce Tariff 12 customers' minimum annual charge if they agree to changes that will boost the net profit of the custom network arrangement.

In an interview with *Network World*, AT&T General Attorney John Langhauser said the carrier is willing to consider renegotiating the minimum annual fee for any Tariff 12 customer, a departure from what had been the standard practice.

In the latest evidence that AT&T is serious about trying to keep Tariff 12 customers, the company slashed by 61% the minimum annual charge of a Tariff 12 deal for Bridgestone/Firestone, Inc., which in turn agreed to higher service rates that will increase the deal's net profits by \$60,000.

"The [minimum annual charge] is extremely important to us," Longhauser said. "But that doesn't mean that in the right circumstance we would not look at a reduction of the [minimum annual charge]."

"If a customer is looking for a reduction and is willing to trade off higher rates and AT&T makes as much or more money with the lower commitment, we'd look at it," he said.

"The bottom line is that

AT&T's net revenues under the refiled [Bridgestone/Firestone] option are greater than they were forecast to be under the initial option," Longhauser said. "That's the reason the deal was done. It was a good deal for the customer and a good deal for AT&T."

Industry observers say AT&T's willingness to rework the minimum annual charge is good news for many of the carrier's custom network users.

"There are a number of Tariff 12 users out there who are having trouble meeting their minimum annual charge," said Henry Levine, an attorney with Morrison & Foerster, a law firm in Washington, D.C. that helps users renegotiate custom net contracts.

Although AT&T is more willing than in the past to reduce the minimum annual charge for Tariff 12 deals, it is still dragging its heels when it comes to making new network services available to current Tariff 12 customers.

AT&T services that are not available under Tariff 12 include Accunet T45 DS3 and Accunet Switched 384 services. The carrier just recently brought its switched digital services, which have been available for some time, under Tariff 12.

— Bob Wallace

US Sprint offers clear channel

continued from page 5

less [Communications, Inc.], which already offer the service in 64K bit/sec increments. Although [US Sprint] announced fractional T-1 in 1989, it was only available in 56K bit/sec increments."

US Sprint also unveiled, as expected, a program under which it will monitor extended superframe format (ESF) T-1 line performance free of charge ("US Sprint to offer free T-1 monitoring," *NW*, Feb. 25). ESF, a T-1 framing format, enables carriers and users to monitor T-1 line performance from CSUs without tak-

ing the line out of service

With the Clearline ESF Monitoring Program, technicians at US Sprint's Network Control and Management Center in Atlanta will remotely track performance of customers' T-1 lines. Under the program, US Sprint will monitor T-1 performance from a series of workstations in Atlanta that poll monitoring units at digital access and cross-connect systems in the carrier's network. The monitoring units, in turn, poll carrier and customer CSUs.

When technicians detect intermittent failures, a service impairment, soft failure or the continued deterioration of circuit quality, they will alert the user within an hour. □

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